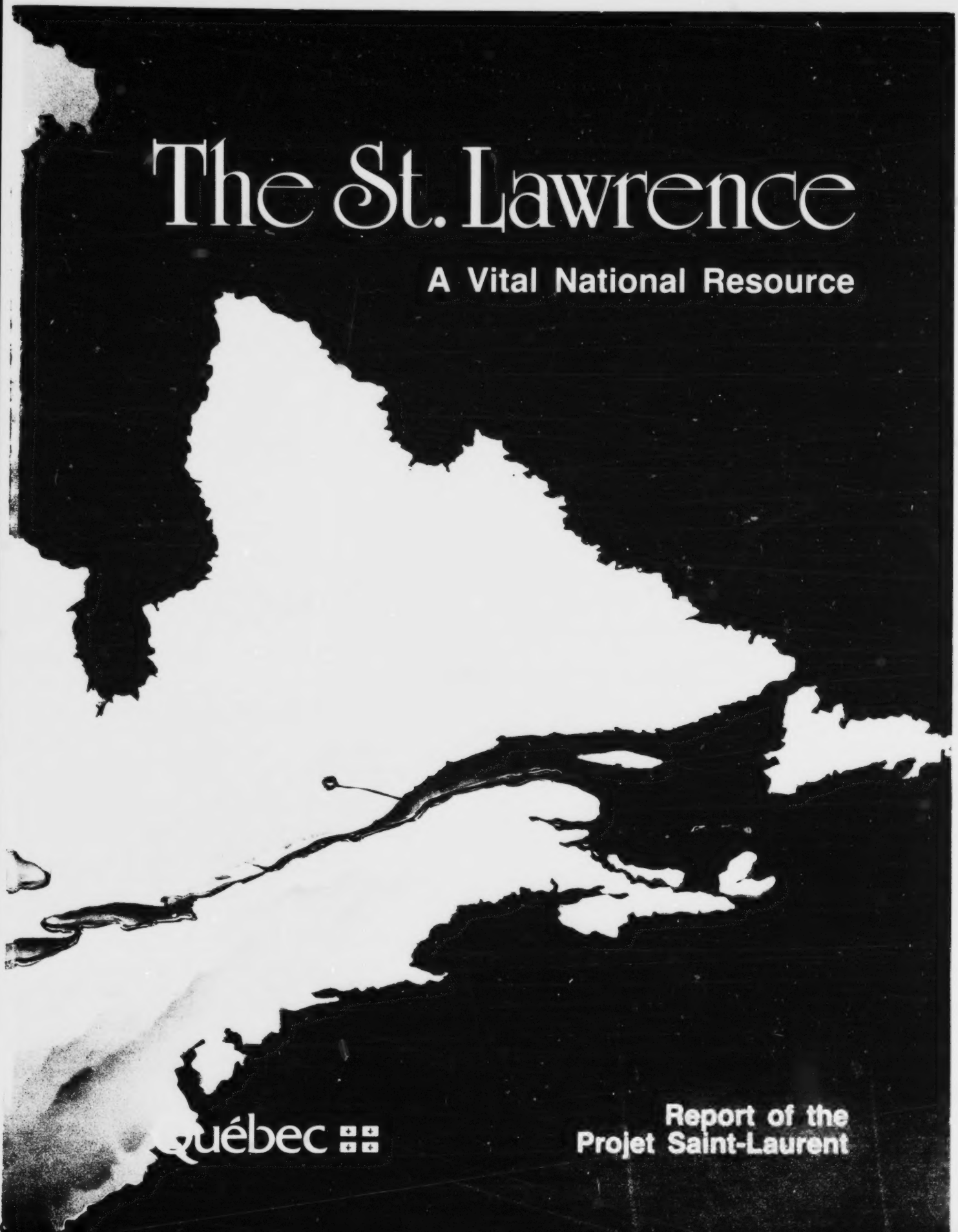
The St. Lawrence

A Vital National Resource



Québec

Report of the
Projet Saint-Laurent

The St. Lawrence
A Vital National Resource

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Principal Collaborators:
R. Clive Meredith
Mary Plaice
Gillian Baird
Madeleine Leclerc

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A Vital National Resource

Report of the
Projet Saint-Laurent

Projet Saint-Laurent
June 1985

Québec

Gouvernement du Québec
Ministère du Conseil exécutif
Secrétariat Général

Québec City, June 1, 1985

Mr. Secretary General,

The **Projet Saint-Laurent** (St. Lawrence Task Force) was instituted in July 1982, by the ministère du Conseil exécutif. Its terms of reference were to advise the government on developing the potential of the St. Lawrence River, with particular attention to the international transport of merchandise.

Throughout months of unrelenting work, the conviction grew among the members of the Team that the assignment it had been given was indeed well-timed, necessary, even urgent. Now the required research and consultation are finished. With pleasure and pride I submit the Team's report.

Please be assured of my full devotion to this policy for the development of a vital national resource.

Yours sincerely,

Hugues Morrissette,
Director

Gouvernement du Québec
Ministère du Conseil exécutif
Secrétariat Général

Québec City, July 9, 1982

Mr. Hugues Morrissette, Director,
Projet Saint-Laurent
Conseil exécutif
875, Grande-Allée est
Édifice « H », bureau 2.206
Québec (Québec)

Dear colleague,

This will confirm our recent discussions, and outline the salient features of your terms of reference for the coming months.

To begin with, you will advise the government on an integrated policy to ensure maximum development of the St. Lawrence River, with special attention to the international transport of merchandise. I would like you, with the assistance of your team, to act as representative of the Secrétariat général du Conseil exécutif in all government action in this area.

I consider this entire project of primary importance for the development of Québec, and I look forward eagerly to its findings.

With every good wish for success.

Yours sincerely,

Louis Bernard

Louis Bernard
Secretary General,
Conseil exécutif

St. Lawrence Task Force Personnel

Principal Officers
Hugues MORRISSETTE, Director
Guy LEMIEUX, Assistant-Director
Roger PÂQUET, Secretary

Advisors
Pierre BROCHU
Jean GAGNÉ
Guy GAGNON
Marc GAGNON
Réjean LECLERC
Maryse LEMIEUX
Serge LÉVEILLÉ
Benoît MASSICOTTE
Léonce NAUD

Cartography
Louise LECLERC

Communications
Andrée LeMAY

Secretarial Staff
Francine BÉLANGER
Chantal HAMELIN
Michelle LAUNAY
Micheline LÉVESQUE
Céline MORAND
Sylvie PARENT

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INTRODUCTION

Québec: A Vast Maritime Region

History and geography have conspired to make Québec one of the great maritime regions of the world, and thus of America. Québec has been shown to be Canada's "maritime province" *par excellence*. It would be only right and proper that she lead the way in the maritime sector, just as she has done in the field of hydroelectricity.

To be more specific, the St. Lawrence River is not merely the major artery of what some would call the "useful" part of Québec — far from it. For over three hundred years, the River has served as a traffic corridor of prime importance and a mighty gateway to a continent, linking much of inland North America to an area predominated by Western Europe. Surely, given the traffic flow which it carries, the volume of its water and the nature of its bordering countryside, such a river — nay such an arm of the sea — should be one of the first resources developed.

The essential elements are already there. But where affirmations of this kind are made, and wishes and desires expressed, they must be supported and justified. Facts must be viewed as a whole; potential must be drawn out, and a community awareness created. The principal problems involved in a beneficial action must be understood. Only when this has been done can the action involved finally be given a certain direction. To this, then, the St. Lawrence Task Force applied itself.

Observations

Clearly there is no lack of the principal resource. But this is a resource which commands respect. The know-how involved is already impressive. Most encouraging is the fact that all of the various partners share a common wish to derive the maximum benefit from a unique resource.

The report, as we shall see, describes a situation which is promising. At the same time, however, nowhere does it claim that all the problems will be easy to solve. And yet, throughout this report, evidence shines through of a wish to reap full benefit from this geographic and human resource. The reason is simple to grasp: this seemed to be the spirit underlying all the answers to our many questions. And this same spirit, from the very outset, guided the members of the St. Lawrence Task Force.

For three centuries, the St. Lawrence has been a major artery and a mighty gateway to a continent.

Photo: Benoît Massicotte

Our priority study of international transport of cargo quickly led us to consider other subjects: not that we found it necessary to do away with any distinctions to be drawn between areas to be protected and those to be exploited; but the River's potentialities are many, and while they do not rival each other, they are related, sometimes interdependent, and even, in some cases, contradictory.

We decided, then, to cover a number of aspects, with the understanding that development of business and the economy must, whenever possible, go hand in hand with cultural and political action. This is not just and old theory, but a lesson taught by the River itself, whose many resources can be used in such a number of ways, if only those who want to use them can see eye to eye, and whose development has surely been neglected for want of any joint long-term project.

In order to do the best job in the shortest time, we had to resign ourselves to devoting unequal time to the various themes. The reader must not be surprised that certain matters are not studied or analysed in depth while others are discussed at great length. Our goal, which doubtless was that of our principals, was to get rapidly involved in developing maritime transport and trade, with the hope that, through this action, other equally necessary developments would become easier to achieve.

The Report

The report consists of three parts, each of which is divided into sections.

In the *first part*, the strategic location of the River[1] is discussed, after which we shall examine the various types of goods carried on it. There follow a description of the state of the infrastructures, and some notes on the various people and organizations involved. This part closes with a summary of the costs related to maintenance and operations.

If our examination of river traffic is to be useful, the various goods carried must be dealt with separately, for after all, it is these goods which justify the routes, the arrangements, the ships themselves, their use, the various methods of financing and administration, and the planning. So if a section of this first part appears out of proportion to the rest of the report, the reader should not be surprised. It is intended to be!

The *second part* deals with other facets of river development. These are many.

Water itself is a basic resource: one to be protected and used with great care. The section that follows deals with ways of living in relation to the River and the sea, whence Québec derives her valuable heritage. For here is a unique resource; a heritage which must be made to bear fruit.

Another section covers major areas of activity: wildlife conservation, recreation, tourism and commercial fishing. For we had to emphasize that any development policy would require effective joint action in many ways.

Finally, we shall point out that because hydroelectric power is one of the River's great gifts to the community, Hydro-Québec is a valued partner in any activity involving the River.

In the *third part*, the various points proposed in the previous parts will be re-examined with a view to sorting out the elements of a coherent strategy. Our purpose here is to facilitate the government's task when the time comes to make choices and determine priorities.[2]

A Great Tradition

While this Report was being written, a number of exchanges were being carried out with knowledgeable persons and, through them, with active institutions. Lists of briefs received and of persons consulted will be found in the appendices to the report.

A sizeable volume of testimony and information soon took its place beside the bibliography which was already available. In order to derive the most from these sources, we adopted no *a priori* theories or outline. We did, however, view things from a certain historical perspective, which brought us to the conclusion that a fine tradition of River development had existed before. Some highlights of this great history follow...

---

1 Failing indication to the contrary, "River" means the entire waterway between the Great Lakes and the North Atlantic, and includes its principal navigable tributary, the **Saguenay**.

2 The report includes four appendices and a bibliography. In addition, about 1 800 pages of complementary appendices that are not published with the report are available for consultation at the offices of the Projet Saint-Laurent.

Even before the Europeans arrived, the St. Lawrence was used as a means of supply, exchange, trade and transport. Possibly in the 15th Century and surely in the early 16th, the marine wealth of the coasts, the gulf and the estuary were being harvested by Spaniards, Portuguese and Basques. Then Cartier sailed up the St. Lawrence until his smallest ships hit their first obstacle: the rapids near Montréal. Cartier opened the door to the North American continent, and blazed the trail for a more systematic exploration.

Some seventy-five years later, France decided to develop a permanent colony from which she expected a flow of resources, furs in particular. Because of the great demand for furs, trading parties penetrated the continent by way of the River and its tributaries. This was the beginning of New France, and once again the river system was to determine where population groups would settle and trade would flourish.

The native birchbark canoe provided by far the best means of penetrating, exploring and organizing the territory. It was also the best means of trading. Soon, however, craft of all kinds began to appear on the St. Lawrence. Infrastructures were set up, maritime occupations were founded, beacons and markers were laid out, with transhipments and coastal freighting to follow. It is difficult to believe that as far back as 1602, Rouen shipbuilders were already studying means of getting more out of return journeys to New France. In an ingenious move, Captain Pierre Chauvin of Rouen proposed that ships take on salt at Brouage and carry it to Gaspé, then, once at their destination, pick up a load of cod for Spain, Marseille and Le Havre. At each of these five points, he sought a profit. And as early as 1661, marine training began taking form and structure, both in Québec City and in Montréal.

From the limits of the St. Lawrence basin, explorers pursued their way along other water systems, more especially toward the north and the southwest. By 1750, France had made use of the St. Lawrence to take over almost all of the continental interior, from Acadia to Louisiana. Except for a wide strip along the coast (east and south-east) occupied mainly by the British colonies, and apart from the unknown lands to the west and a few northern zones visited by the English, the new American continent was French territory.

But the vast area the St. Lawrence opened up was remote; it had few inhabitants and was difficult to defend. Developing it presented a host of problems other than simply exploration. When the British attacked in 1759, the remote colony had but 70 000 inhabitants, quite naturally concentrated — or scattered — along the valley of the St. Lawrence. By this time the population of the Anglo-American colonies had already grown to over one million. While the St. Lawrence represented a wonderful route for immigrants, it would be put to other uses.

With the Treaty of Versailles in 1783, part of the boundary between Canada and the United States was set in the middle of the Great Lakes, and the Canadians could do nothing to change it. From that moment on, what had been called the "natural empire" of the St. Lawrence was split up. Among other things, Canada lost a coal basin which soon would be at the origin of the development of the Great Lakes states and of the industrial heart of the U.S. The operation of the St. Lawrence would have to be carried out in competition with that of other waterways. We now know that it was exploited with a view to linking regions outside its natural basin. Gradually, the image took shape of a complex heritage — economic, cultural and political — which today, as we study a policy for river development, we must bear in mind.

Naval shipyards on the St. Lawrence developed to a degree which is difficult to imagine today, albeit essentially to the benefit of major outside powers. When metals and motors made their appearance, Québec and Canada, despite legendary prowess, were unable to keep pace with the industrial empires.

The Treaty of Washington (1871) guaranteed free navigation to both countries whose land bordered on the Great Lakes and the St. Lawrence. The United States found a new outlet for their products. The relationships of Québec, Ontario and the rest of Canada with the St. Lawrence basin and the Great Lakes were subject to a thousand and one servitudes connected with the economic, cultural and political ties between the parties, and with geographical conditions.

The age of oil replaced the age of coal, and the American and Canadian West and the U.S. "sunbelt" were able to speed up industrial development and manpower migration. Subsequently, an already-complicated situation has been even further disrupted by the world energy crisis and the rise of such countries as Japan.

Since that time, hydroelectric development, a gradual mastery of winter navigation and the establishment of the Seaway led to considerable improvement in this waterway's economic potential. Total traffic on the Great Lakes and the St. Lawrence — to take just that example — has grown progressively to almost three hundred million tonnes annually. But developing the St. Lawrence did not become much easier.

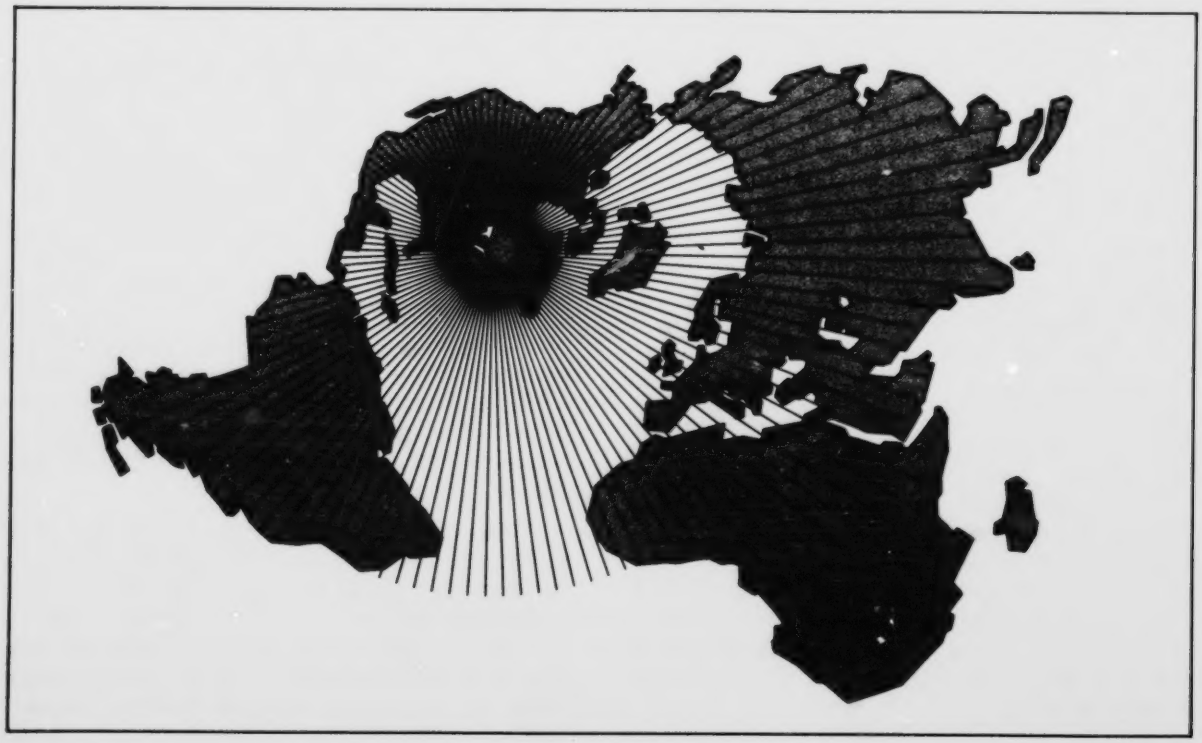
Over the past few decades, a new source of concern has risen: progressive deterioration of numerous aquatic milieus, especially the waters of the St. Lawrence and the Great Lakes. In its own way, this deterioration speaks volumes in favour of joint action in development of the resources — be they natural or acquired — of the St. Lawrence. Today, the U.S. industrial heartland is in trouble. What of Canada's investment in the St. Lawrence and the Great Lakes? While it may have contributed to developing the River's economic potential, it has not founded the basis for any effective, or at least satisfactory, joint action on the part of all the riparian territories concerned. While Québec occupies what is obviously a strategic position, it is enmeshed in a situation from which it is frequently difficult to derive any benefit.

When the St. Lawrence Task Force began its work, people were all too willing to talk both of their pride in living on the world's most beautiful River and of their concern at not drawing their fair share of benefit from this great waterway.

In discussing the past, people would reminisce about how things had changed from the days of the great shipyards and the coastal freighters. In discussing the present, they would talk of how others were doing the work while the people of Québec tended to a certain extent to sit back. And in discussing the future, an attempt was made to find areas for collaboration and to learn where Québec's ambitions lay.

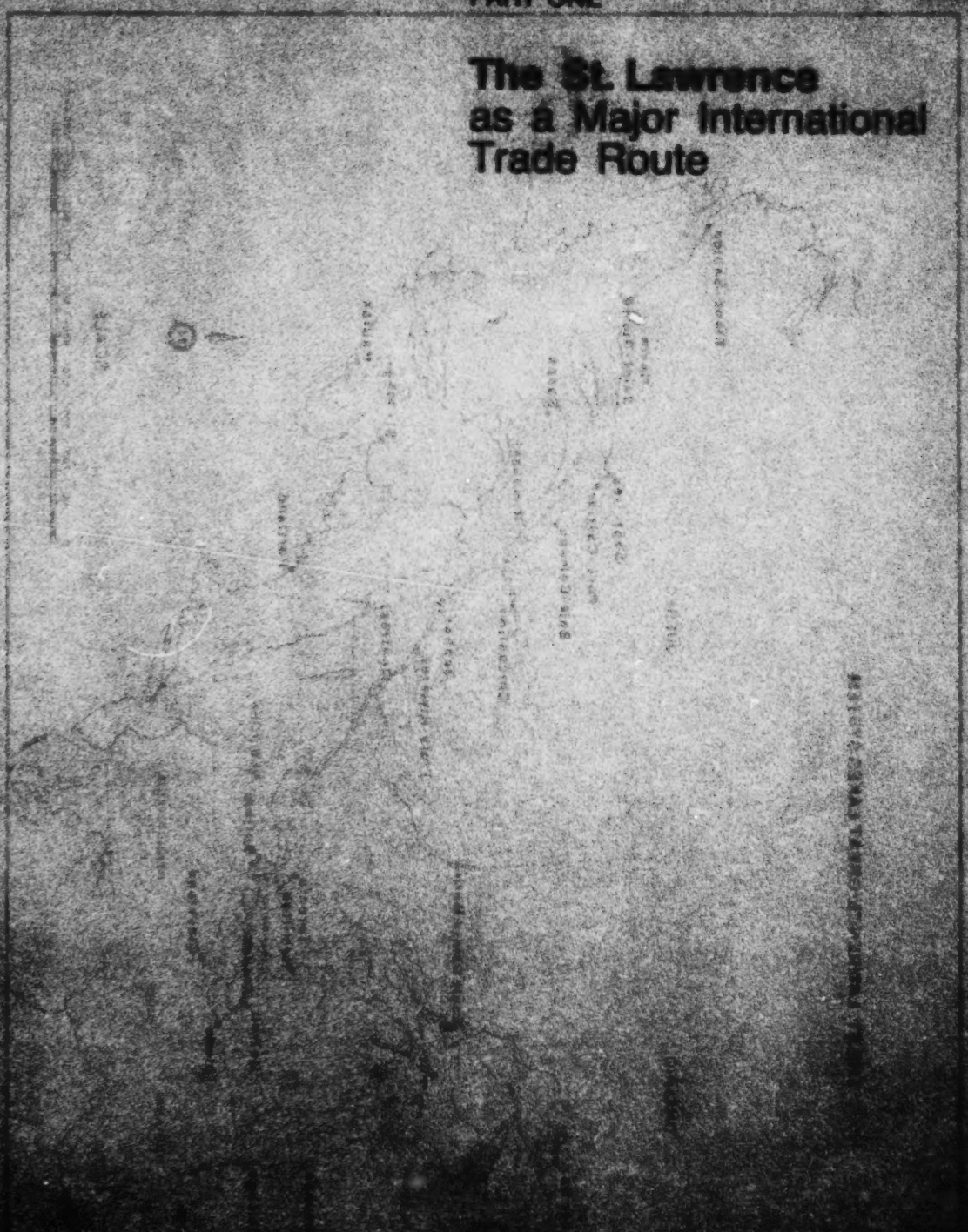
The team, then, decided to first draw up a balance sheet. It had no intention of doing anyone else's work or of making the government do anyone else's work. Rather, the goal was more modest: to reawaken public awareness to the existence of an incomparable resource, by recalling the facts, and to stimulate a revival by making proposals to the government which would take account both of the past and of the present.

The central feature of this report — if there is one — is Québec's favoured position in the maritime economy related to the St. Lawrence and the Great Lakes. For that reason, the first part of this report begins by studying this very point.

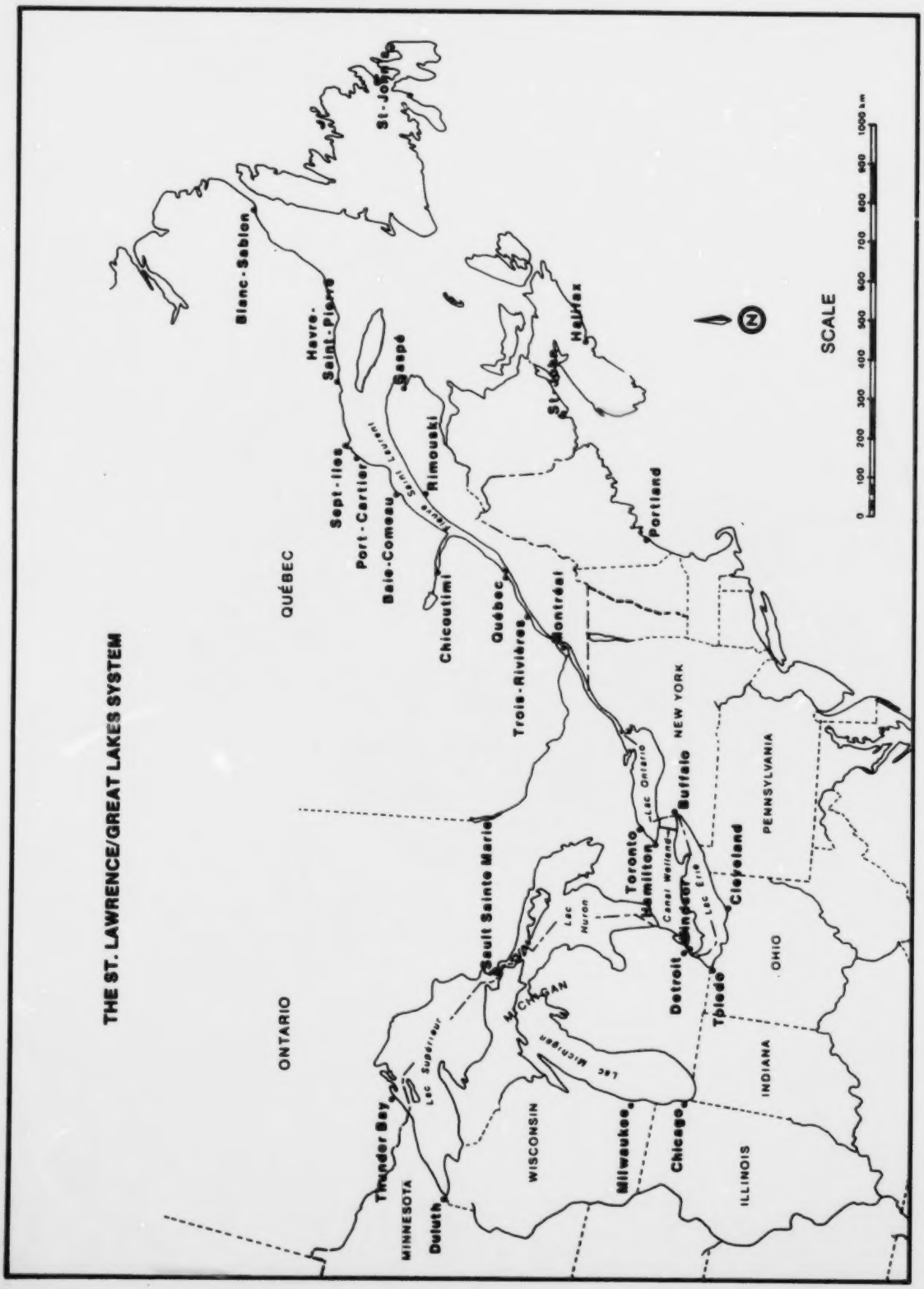


PART ONE

The St. Lawrence as a Major International Trade Route



The St. Lawrence/Great Lakes System



1.1 A Strategic Location

The St. Lawrence is a number of things: a highway for discovery, a route for transportation and colonization, an artery for trade and development, an exceptional navigable route, and finally, the gateway to a continent: designations which more than emphasize the River's vastness. And yet, a question arises: while this river washes the shores of Québec, does it naturally endow Québec with the advantages which, in principle, it holds in the maritime economy of the world, the Americas, and Canada? And when questions are raised about this River, and about its use by Quebecers, of precisely what strategic position can one speak?

The Vastness of the St. Lawrence

Merely by its exceptional scope, the St. Lawrence constitutes a major asset for Québec.

At its source are the five Great Lakes — an inland sea measuring 245 000 km². Various regulating devices keep the downstream flow of water constant all year. Between the Great Lakes and Montréal, the difference in level is enough to provide considerable hydroelectric potential. From Montréal to the mouth, however, the difference is astonishingly, and beneficially, slight, a mere seven metres.[1] Between the eastern tip of Île d'Orléans and the straits of Cabot and Belle-Isle, the River becomes an arm of the sea, and once below Île-aux-Coudres, its depth is no longer a problem for the navigator.

Other rivers of the world may outrank the St. Lawrence as to the area of their drainage basin, their length or their flow, but none of them combines all the benefits and characteristics of the St. Lawrence, whose raw potential is universally admired.

A Modern Waterway

To facilitate very large carrier navigation, it was necessary to change only the middle segment of the River. The dredged channel between Île d'Orléans and Montréal allows large ocean carriers to sail upstream with no difficulty. Between Québec City and Montréal this channel is 10.5 metres deep and 240 wide; downstream from Québec City it is 12.5 metres deep and 300 wide. If they take advantage of the four to six-metre tides in the short channel below Québec, ships drawing 13.5 metres can easily reach that port — ships such as bulk carriers with a dead weight of 135 000 tonnes.

Between Montréal and Lake Erie, the Seaway, completed in 1959, runs 8.2 metres deep. Seven locks provide access to Lake Ontario, while eight others, on the Welland Canal, allow ships to sail up the Niagara "stairway" as far as Lake Erie. Ocean-going vessels of 20 000 tonnes dead weight can reach the Great Lakes, but in this part of the St. Lawrence and on the Great Lakes, traffic is dominated by lakers of up to 220 metres in length and 23 metres in width which can carry up to 30 000 tonnes of bulk cargo.

The channel between Lake Erie and Lake Huron has been dredged to a depth of 9.1 metres. Between Lake Huron and Lake Superior, the Poe lock at Sault-Sainte-Marie is 9.8 metres deep and can accommodate superlakers 305 metres long carrying 68 000 tons. Above Niagara Falls, these vessels are used by the Americans to carry iron ore and coal.

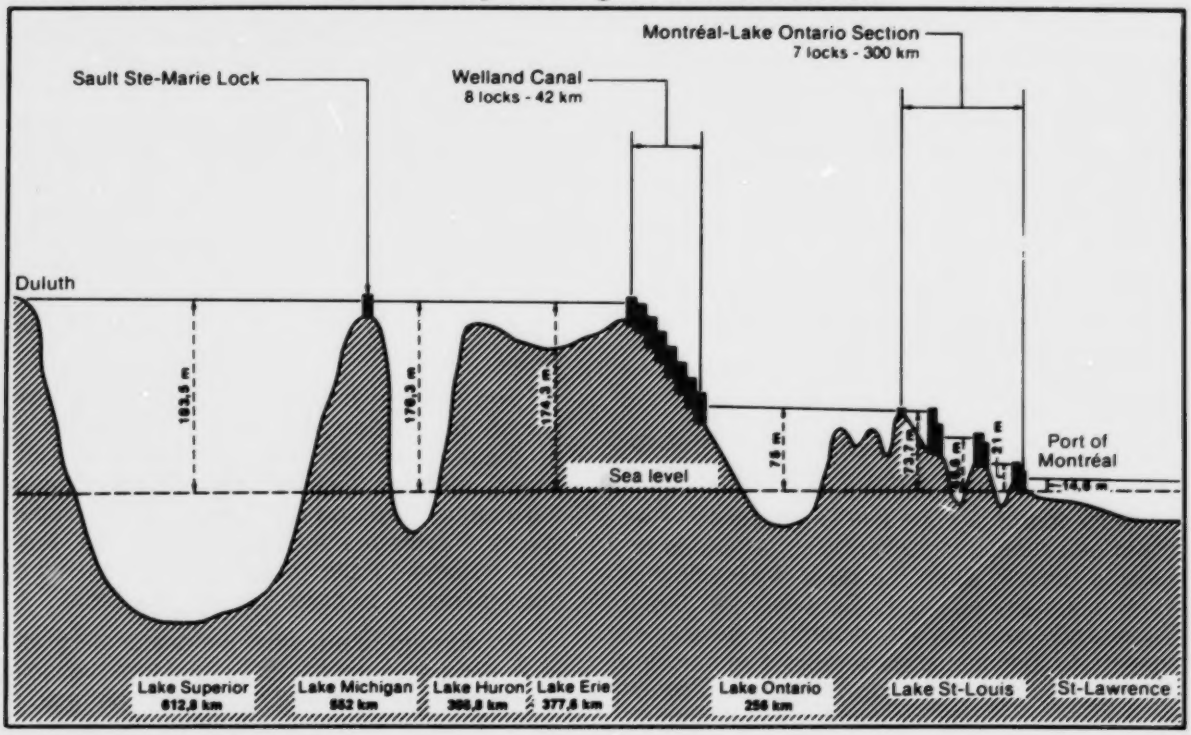
To sum up, then, what we are dealing with is a navigable route for very large vessels, running a distance of 3 770 km from the head of Lake Superior to Cabot Strait or the Strait of Belle-Isle. For over twenty years, various works and services designed for winter navigation have kept this waterway open as far west as Montréal. Above Montréal, navigation usually stops from the middle of December to the end of March.

All along this waterway stretches an impressive array of ports, adapted to traffic of all kinds and to the most recent technology for loading and transhipment. An elaborate system of railways and highways links this waterway to the hinterland; and finally there is a tightly organized network of services of all kinds (beacons and locks, information and communication, work sites, security, pilotage, weather stations, and so on).

In short, as far as modern equipment and capacity are concerned, the St. Lawrence River can surely hold a candle to any of the world's major waterways. In fact, there can be no doubt that it ranks among them.

1 Only one-tenth that between the source and Montréal.

The St. Lawrence/Lake Ontario Seaway — a longitudinal cross-section



Source: St. Lawrence Seaway Authority

The Gateway to a Continent

The River's geographic location makes the St. Lawrence the easternmost gateway to the continent and the shortest route between North America and a number of European markets.

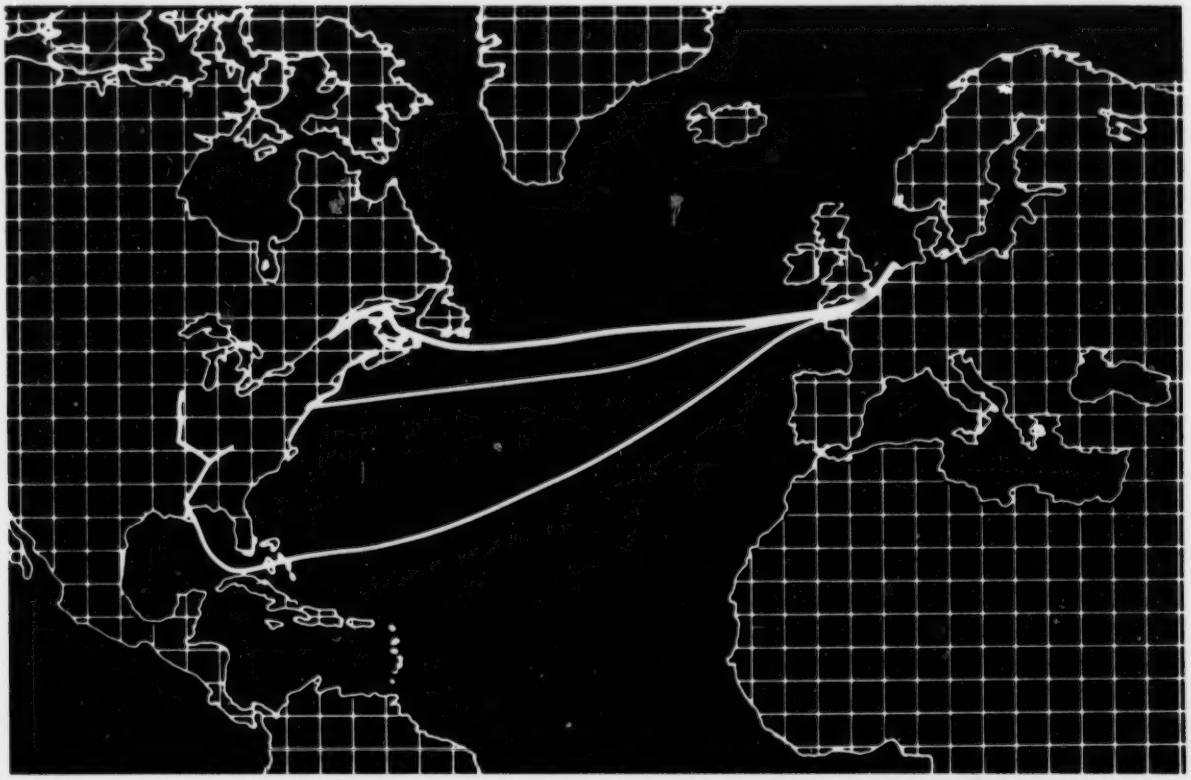
The St. Lawrence flows generally southwest/northeast; it acts as a border between two industrialized zones (among them one of the most important in the United States), and it is of unusual length. All these factors combine to make the St. Lawrence a major international trade route.

The Trade Route

Even incontestable advantages such as these, however, give us cause to ponder, since no navigable waterway can become economically profitable solely on the strength of physical size, development and services, and geopolitical location — no more than the people of Québec can derive a fair benefit from the sole fact that their territory borders the River, that the population of Québec is clustered around its principal ports, and that the waterway is used by many ships.

Purely from the point of view of commercial economic development, it would be futile to talk about strategic advantages without bearing in mind that any developed river basin has always been an economic basin: it is in relation to this that Québec's position must be assessed.

In other words, while this may be self evident, a maritime trade route, regardless of its size, gives strategic advantages only to those who use it for its obvious purpose or reap the benefits of its principal use. And if we are to provide an accurate picture of the so-called benefits which Québec derives in this respect, we must first study the general economy of the St. Lawrence, and the situation which it creates, or could create, in Québec.



The St. Lawrence provides the easternmost gateway to the Continent, and the shortest route between North America and many European markets

Economic Areas

Under the French régime and until the 19th century, economic activity developed primarily along the Québec part of the St. Lawrence Valley, and in southern Ontario. As population grew and industrialization flourished in Pennsylvania, Illinois, Ohio, Indiana, Michigan and Wisconsin, the situation changed radically. Mainly because of the coal resources of the Great Lakes and the iron ore at the Lakehead, and with the Lakes providing an especially economical type of transportation, industrial activity developed in particular at the source of the St. Lawrence.

The region kept developing at a spectacular rate for a century. By 1900, bulk traffic on the Great Lakes was up to 35 000 000 tonnes. By 1980 it had climbed to 200 000 000 tonnes and thanks to the Seaway, Great Lakes plants are being supplied all the way from Labrador.

Between 1959 and 1983, total traffic along the St. Lawrence Seaway rose slowly from 18.5 million tonnes to 45 million tonnes in the Montréal — Lake Ontario sector, and from 24.6 to 50.1 million tonnes in the Welland Canal sector. The reader is referred in this regard to Table 1 which traces development of traffic in the Seaway from 1956 to 1983.

While the Montréal region underwent major industrial development, and this linked it to America's industrial heartland, maritime economic activity still became polarized upstream.

For whatever reasons, the St. Lawrence increasingly became known as an intermediate transport route: as a link in an international trade network. This came about all that much more easily because the River was also a border and its development, or rather its use, became ever more competitive. In the end, it was those economic centres whose development depended on the St. Lawrence which finally determined even better than could geography the direction of the current and the nature of the developed St. Lawrence.

Strength or Drawback?

Québec's greatest strength lies in the fact that it constitutes one of the major maritime regions of the world, of North America and of Canada. Québec has been this, and still is. No one can change the face of the world at will; no one can remake history.

But once this asset of Québec's began to be used primarily for trade, the first strategic advantages were felt by those activities which contribute to maritime trade.

While the benefits derived from water supply and from hydroelectricity are great, they are not necessarily advantageous for maritime trade.

What could be called Québec's next greatest asset, which constitutes its major strategic advantage in maritime trade, is that it occupies most of the waterway and can make use of it in keeping with its entire economic potential.

While the St. Lawrence has contributed to the development of major centres of maritime commercial activity outside Québec, this does not put Québec in a position of weakness except to the extent that Québec does not take enough of a part in the development and organization of this maritime trade. Nevertheless, regardless of Québec's level of participation, that first condition must always be seen as an advantageous strategic position; indeed a most advantageous one.

And there is more. As a detailed study will show, almost one-third of all goods handled in Canada go through Québec ports. This alone indicates that already Québec is the most active of all Canadian provinces in maritime trade.

Table 1

Cargo Traffic in the Seaway, 1956-1983
(in tonnes)

Years	Montréal — Lake Ontario			Welland Canal		
	Upbound	Downbound	Total	Upbound	Downbound	Total
1956	—	—	12 246 926	—	—	20 925 711
1957	—	—	11 059 804	—	—	20 297 573
1958	4 236 848	6 433 892	10 670 740	4 532 216	14 767 731	19 299 947
1959	9 859 296	8 603 676	18 463 072	2 650 091	15 986 095	24 636 186
1960	7 966 686	10 458 859	18 425 545	7 595 726	18 939 591	26 535 317
1961	7 470 330	13 774 225	21 244 555	6 956 067	21 579 729	28 535 796
1962	9 869 878	13 348 635	23 218 514	9 837 088	22 283 511	32 120 599
1963	12 283 527	15 787 862	28 071 389	11 931 922	25 538 593	37 470 515
1964	16 807 010	18 854 140	35 661 150	16 820 710	29 798 947	46 619 657
1965	20 063 218	19 293 715	39 356 933	18 097 391	30 365 394	48 462 785
1966	23 381 932	21 297 085	44 679 017	20 474 083	33 297 172	53 771 255
1967	24 261 386	15 681 393	39 942 779	20 325 165	27 583 534	47 908 699
1968	27 567 040	15 936 692	43 503 732	23 751 872	28 933 508	52 685 380
1969	20 362 424	16 845 512	37 207 936	17 580 432	30 984 102	48 564 534
1970	22 673 273	23 523 808	46 397 081	19 180 524	37 854 148	57 934 672
1971	23 611 105	24 423 612	48 034 717	19 582 487	37 488 823	57 071 310
1972	23 120 793	25 486 927	48 607 720	19 165 470	38 981 856	58 147 326
1973	25 066 189	27 219 499	52 285 688	21 513 793	39 445 223	60 959 016
1974	20 870 763	19 178 890	40 049 653	18 280 279	29 220 677	47 500 956
1975	19 900 223	23 654 814	43 555 037	17 137 864	37 157 171	54 295 035
1976	26 143 555	23 205 716	49 349 271	23 304 389	35 083 182	58 387 571
1977	31 764 812	25 692 497	57 457 309	27 367 349	37 711 195	65 078 544
1978	24 854 039	32 088 641	56 942 680	21 257 777	44 413 215	65 670 992
1979	24 382 965	30 939 128	55 322 093	20 286 150	45 878 396	66 164 546
1980	14 925 615	34 528 494	49 454 109	11 986 348	47 619 633	59 605 981
1981	18 822 201	31 747 056	50 569 251	16 601 880	42 248 995	58 950 875
1982	11 149 898	31 665 416	42 815 314	8 824 477	40 199 632	49 024 104
1983	15 579 017	29 481 964	45 060 981	12 305 327	37 839 759	50 145 086

Source: St. Lawrence Seaway Authority, 1956 to 1983, Operation, Outlook, Statistical Report.

But do we realize this? Are we getting as much out of this as we should? How are we planning our action? That is something else. First of all, it is most important that we draw up a balance sheet of traffic on the St. Lawrence: any proposal for the development by the people of Québec of such a national resource would be distorted if it took no account of the main use made of the waterway: maritime trade.

In the sections following, the Report describes and analyses traffic, infrastructures, people and organizations involved, and costs of maritime trade on the St. Lawrence.

1.2 Maritime Traffic

Maritime traffic necessarily has its own categories. To refer to bulk cargo, containers, Ro/Ro[1] or general cargo is to refer both to various types of products and to various techniques for maritime loading or transhipment as well as to a variety of vessel types. Port site development must be adapted to requirements.

1 Roll on/Roll off: a type of vessel specially designed for loading and unloading, using self-powered, self-contained tractors or other wheeled vehicles.

The Port of Montréal sees one type of traffic which is rare in the Great Lakes and on the Mississippi: general cargo in containers.

Photo: John Hutchinson

Moreover, maritime trade is frequently related to various means of transport other than by water. Railways, highways, oil and gas pipelines and air transport all figure in an analysis of maritime traffic and the economy which it supports.

It will be said, for instance, that bulk exports occupy a major place among Canadian exports and in the assessment of Canada's G.N.P. (see Table 2). This is not the case for all industrialized countries.

It will also be said that impact on jobs will vary according to products carried and the special types of maritime transport. It is well known that general cargo transport requires more handling and more manpower than bulk transport (see Table 3).

Or again, concern will be expressed about both complementary and competitive means of transport. And comparisons will be made with traffic on routes which are competitive to a certain degree: the Mississippi as against the St. Lawrence, for instance.

Occasionally, we shall point out the benefits of exporting manufactured products, as compared to those — not as numerous — of exporting unprocessed raw materials. Stress will be laid on the economic impact of local shipments or arrivals, which are of greater benefit than transhipments.

In economic terms, a number of factors are of interest: cargoes, products, the state of the product — imported to be processed or exported in raw state — origins, destinations and the use of transhipments, to name but a few.

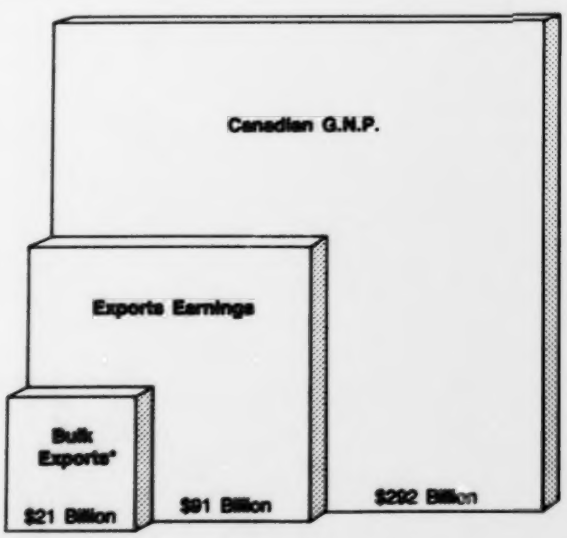
And because this is so, maritime traffic has been the object of many studies. We have summarized the most important of these, and the most recent, seeking above all a balance.

Bulk cargo accounts for the highest tonnage carried between the Great Lakes and the River proper, and for most of Québec's coastal freight; we shall therefore be discussing this kind of cargo in greater detail. Then we shall study general cargo, especially containerized cargo, and by studying this market we will gain a better idea of the development of Québec's ports.

But first of all, some general data: interesting in themselves, and ultimately useful.

Table 2

Canada's Exports and the Canadian G.N.P., 1980



* Forest products, grain, coal, sulphur, potash

Source: Ruppenthal, Karl M., *Canada's Ports and Waterborne Trade*, Vancouver, Center for Transportation Studies, U.B.C., (n.d.), p. 5.

Table 3

Number of Jobs Created in Ports by Commodity Handled (Port of Houston) (by 1 000 000 tonnes)

Commodity Group	Number of Jobs Created pers/year
Containerized cargo	830[1]
Breakbulk	783
Steel	457
Grain	59
Other dry bulk	30
Petroleum products	15
Other liquid bulk	44

Source: Booz-Allen and Hamilton Inc. (1982), *The Economic Impact of the Port of Houston*, Port of Houston Authority, pp. 1-5 and 111-8

1 These figures are tentative. They were obtained by dividing the total number of port jobs by the total number of "million tonnes" handled yearly in the port. Note that the particularly high number of jobs for containerized cargo seems typical of Houston, but this fact does not render the table invalid as an example.

A Few Salient Points

Maritime transport is economical. How often has this been said! How often must it be repeated! Since energy counts for much in transportation, we should review a few basic facts.

For every litre of fuel consumed, a ship moves 31 tonnes per kilometre, whereas a train moves 25 tonnes, and a highway carrier only seven.

Of course, a host of other factors enter into the choice of a carrier, but still, that basic factor cannot be neglected.

We shall be focussing our attention on bulk cargo and general cargo. Competition among the different types of transport involved here is not the same. The carriage of bulk goods pits ships against trains and pipelines, whereas the carriage of general goods involves competition from railways and trucks.

But now that we have raised the ideas of comparison and competition, we should examine them from a different point of view which will allow us to point out some major characteristics of our waterway. Let us compare, then, traffic on the Mississipi and its tributaries with that on the St. Lawrence and the Great Lakes. In both cases, 90% of what is carried is bulk: grain, coal, iron ore, petroleum products, sand and gravel.

In 1980, a total of 584 000 000 tonnes were carried on the Mississipi and its tributaries. An American survey[1] tells us that the total carried on the Great Lakes was 200 million, while that carried on the St. Lawrence itself was 129 million. In other words, the volume of goods carried on the U.S. waterway was four to five times that carried on the St. Lawrence and almost three times that carried on the Great Lakes. Yet the Mississipi and its tributaries have a draught of only 2.75 metres. There are 129 dams or locks, and hundreds of twists and turns, to say nothing of moving sand banks. Only Baton Rouge and New Orleans are real seaports.

Until quite recently, it is true, there were no user fees on the Mississipi, so it was that much easier to build up a fleet of barges and tugs adapted both to locale and to product. Nevertheless, it is quite clear that geographic and natural advantages, like those derived from harbour or other developments, do not necessarily have a decisive or automatic impact on a maritime or river economy. Traditions, ways of life, captive markets and a number of other factors of maritime trade also come into play. And if even greater benefits are to be sought, the merchant economy must be adjusted to the maritime economy.

The St. Lawrence proper has a distinguishing feature: all its ports, as far upstream as Montréal, are seaports. And Montréal is by far the furthest inland of eastern North American seaports. The St. Lawrence is unique from this point of view, and for a great distance it accommodates ocean shipping of vast dimensions. This cannot be said of the Seaway above Montréal, which only small ocean vessels of less than 20 000 tonnes can penetrate. Possibly one would do better to compare the ports of Québec with those of eastern North America: Halifax, St. John, Boston, New York, Baltimore, Norfolk and others. But here again, comparisons demand caution, since merchant economy can act for or against maritime economy, thus lessening the interest in the comparison — the same way as maritime economy could influence merchant economy.

The port of Montréal handles one type of cargo little seen on the Great Lakes and the Mississipi: containers. Half of the containers are being shipped to or from Montréal (that is, the region adjacent to Montréal: Québec, the northeastern United States, and Ontario). The other half are being transhipped to a much vaster hinterland, in particular the U.S. Great Lakes region. The goods are forwarded by rail and road.

Here above all we are discussing North Atlantic trade with western Europe. The managers of the ports of Halifax, St. John and Boston, but above all of New York, Baltimore and Philadelphia, and various politicians, want traffic which is "diverted" through Montréal to pass through their ports. The shippers object, since for them the Montréal route is the most efficient and the most economical. The opinion that the St. Lawrence carriers cut prices and operate at a loss, thereby bending the rules of the game,

1 U.S. Army Corps of Engineers (1981), *Waterborne Commerce of the United States, 1981.*

has been refuted by, among others, the Riendeau study[1]. Montréal indeed is the most economical route for North Atlantic traffic serving Ontario and the entire Great Lakes region.

Here is one case where the advantages of a developed river favour both the merchant and the maritime economies, and where an advanced study has made it possible to better define the terms of a competition which is in fact quite legitimate.

But let us examine some general data which are immediately useful for describing bulk and general cargo on the St. Lawrence, and for making an initial analysis of special data.

If we look at international maritime traffic, and make a few Canadian comparisons in this respect, we see that Ontario's international traffic has increased by 27 % whereas Québec's has quintupled, or increased by slightly more than 400 %. Ontario's international trade rose from 23.1 million tonnes in 1950 to 29.4 million tonnes in 1982. At the same time, Ontario's share in the whole Canadian international market dropped from 44 % to 17 %. During the same period, Québec's international traffic rose from 13.5 million tonnes to 68 million tonnes, and its share with regard to the whole of Canada increased from 26 % to 39 %.

Indeed, in 1982, seven of Canada's thirteen most important ports (based on tonnage) were Québec ports; the six others were in British Columbia (1), Ontario (3), Nova Scotia (2) and New Brunswick (1). As illustrated in Table 4, the total Québec tonnage is far greater than the tonnage of any one of the other provinces.

Table 4

Traffic in Canada's Principal Ports, 1982
(in tonnes)

Ports	Total tonnage
Vancouver, B.C.	51 649 114
Port Cartier, QC	22 928 520
Thunder Bay, ONT.	22 339 120
Montréal, QC	19 105 441
Sept-Îles, QC	18 821 925
Québec, QC	14 411 148
Halifax, N.S.	10 099 982
St. John, N.B.	8 739 084
Baie Comeau, QC	8 079 601
Hamilton, ONT.	7 927 773
Sorel, QC	4 621 939
Sarnia, ONT.	4 459 732
Baie des Ha! Ha!, QC	3 785 492

Source: Statistics Canada, unpublished statistics.

1 RIENDEAU, B. (1974), *Concurrence et complémentarité des ports du Québec par rapport à d'autres ports au Canada et aux États-Unis*, Collection *Études et Recherches*, Office de planification et de développement du Québec (OPDQ), 255 pp. Regarding "diversions", see: FAIVRE, Jérome, ARCHAMBAULT, Michel and KURASAWA, Hiroshi (1984), *Acheminement en territoire américain du commerce outre-mer canadien à l'exportation, Marchandises générales 1981*, Canadian Transport Commission, Direction de la recherche, DT 20-84-19, 108 pp.

Maritime Traffic in Québec

Québec's ports are numerous. Everyone knows this, and the following map (Table 6) bears it out.

Total maritime traffic in those ports almost quadrupled in thirty years, from 26.9 million tonnes in 1952 to 103 million tonnes in 1982 (283 %). During this time, Canadian traffic rose from 117.8 million tonnes to 305.8 million tonnes (160 %).

Tables 7 and 8 summarize these changes emphasizing that Québec's share of Canadian maritime traffic rose from 23 % in 1952 to 34 % in 1982.

It is interesting to note that in 1982, Québec traffic was distributed among ten ports (see Table 5). In tables 9 to 14, which appear as graphs, we have summarized the development of certain Québec ports with regard to total loaded and unloaded merchandise, or total merchandise handled.

One fact can no longer be ignored: its ports are making Québec Canada's leading region for maritime trade.

If Québec's traffic has grown, this would appear attributable to the increase in international traffic. In 1952, international traffic accounted for 50 % of total Québec traffic, whereas in 1982 it accounted for 66 %. Tonnage increased fivefold, from 13.6 million to 67.9 million. During this time, Canadian[1] traffic in Québec merely tripled, from 11.3 million tonnes to 35.1 million.

International traffic rose by 400 % and Canadian[1] traffic rose by 209 %.

What can be expected between now and the end of the century? The question, while highly relevant, is far from easy to answer. We all know about the reliability of economic forecasts! Nevertheless, as the report progresses, we shall be weighing certain hypotheses in this regard.

Maritime trade in Québec, however, is centred around bulk and containerized cargo, so we shall concentrate on these for the moment. This will give us a better understanding of the state of infrastructures and facilities, the great number of people and organizations involved, and the distribution of maintenance and operating costs.

Table 5

Maritime Traffic in Québec's Principal Ports, 1982
(in tonnes)

Ports	Total Traffic	Internat. Traf.	Nat. Traf.
1. Port-Cartier	22 928 520	19 103 037	3 825 483
2. Montréal	19 105 441	9 372 164	9 733 277
3. Sept-Îles	18 821 925	16 020 735	2 801 190
4. Québec	14 411 148	7 164 534	7 246 614
5. Baie-Comeau	8 079 601	5 159 584	2 920 017
6. Sorel	4 621 939	2 263 098	2 358 841
7. Baie-des-Ha! Ha!	3 785 492	3 324 536	460 956
8. Trois-Rivières	2 257 921	1 350 217	907 704
9. Havre-St-Pierre	1 790 142	281 079	1 509 063
10. Contrecoeur	1 259 756	572 807	686 949
Total Ten (10) Ports	**97 061 885**	**64 611 791**	**32 450 094**
Total Québec	**103 045 278**	**67 906 613**	**35 138 665**
% of ten ports/Québec	94 %	95 %	92 %

Source: Statistics Canada, unpublished statistics.

1 Goods shipped to or from a Canadian port.

Table 6
The Ports of Québec

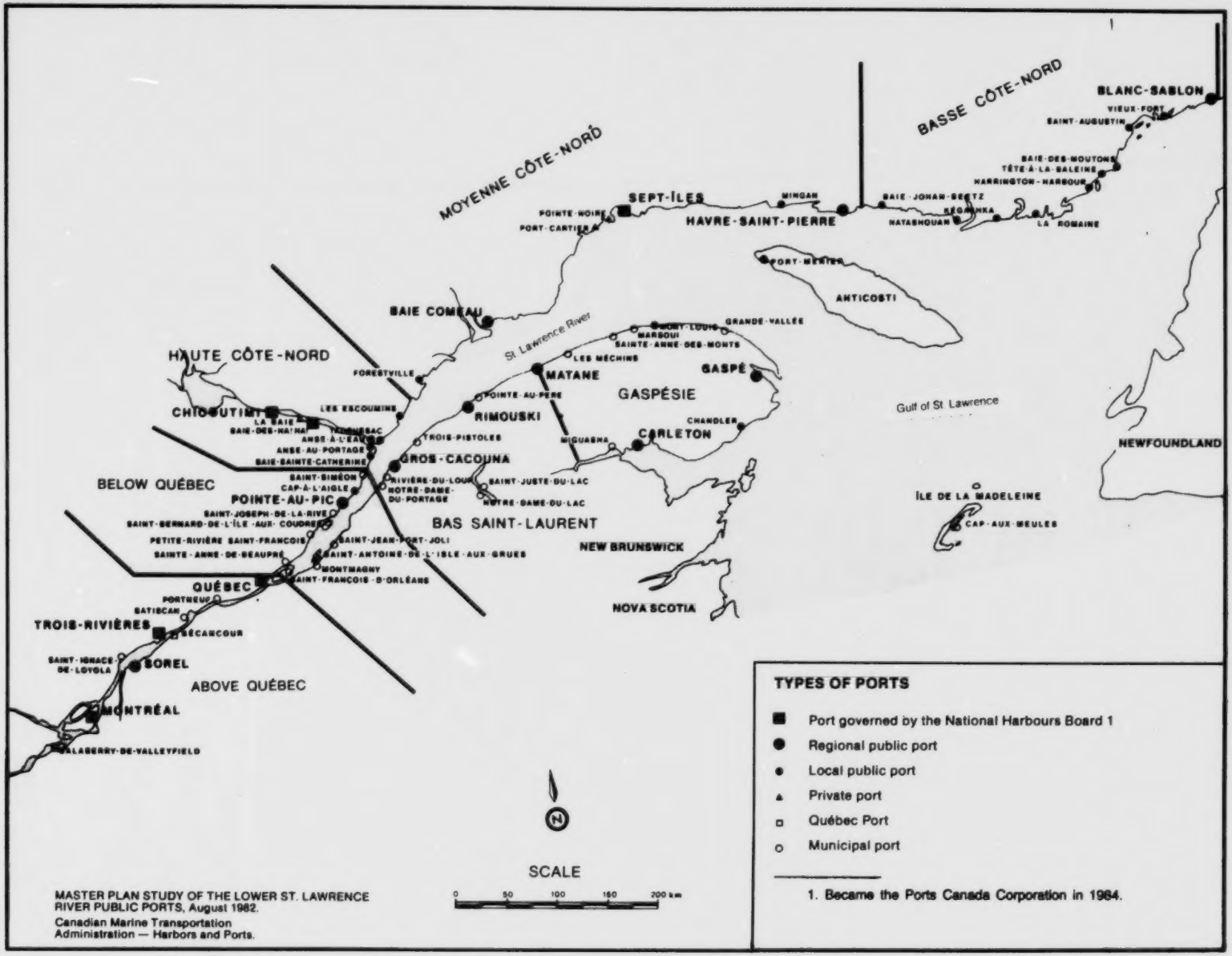
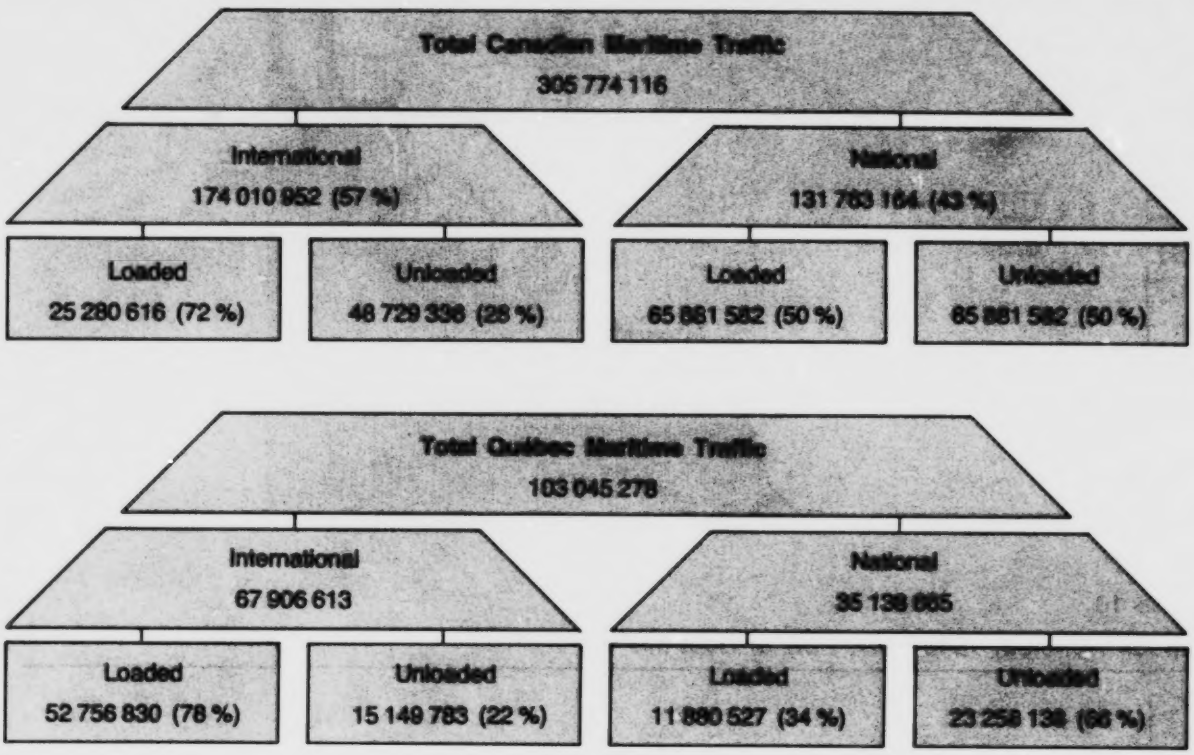


Table 7

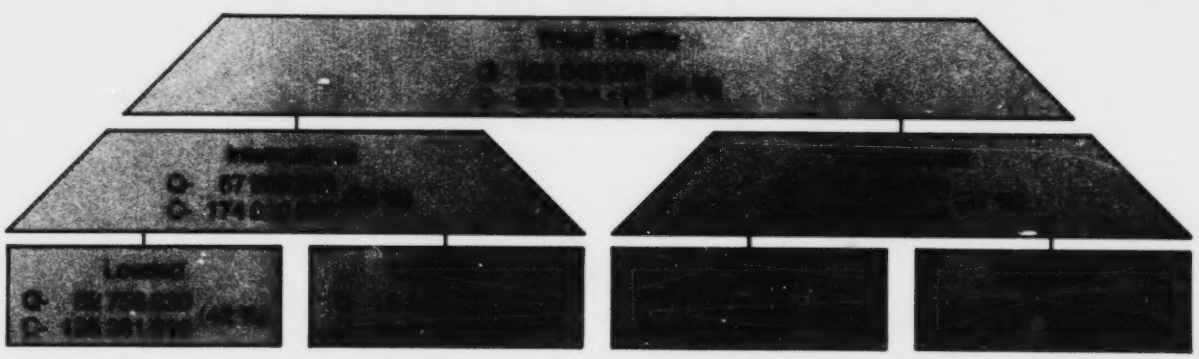
Canadian and Québec Maritime Traffic, 1982
(in tonnes)



Source: Statistics Canada, unpublished statistics

Table 8

Québec's Share of Canadian Traffic, 1982
(in tonnes)



Source: Statistics Canada, unpublished statistics

Table 9

Goods Handled, 1946-1981, Port of Port-Cartier

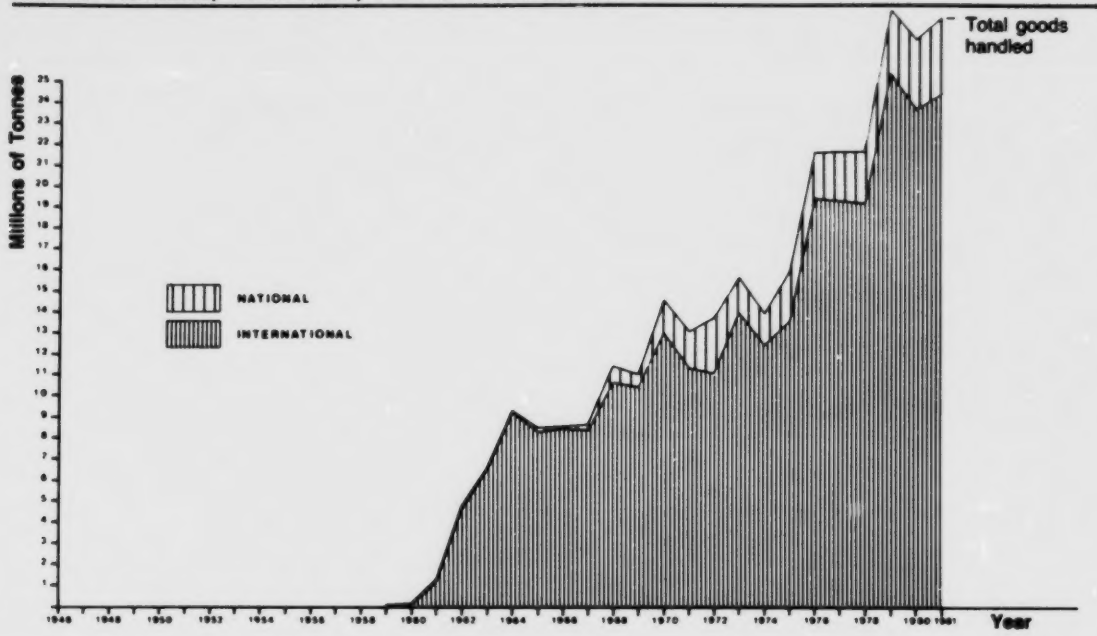


Table 10

Goods Handled, 1946-1981, Port of Sept-Îles

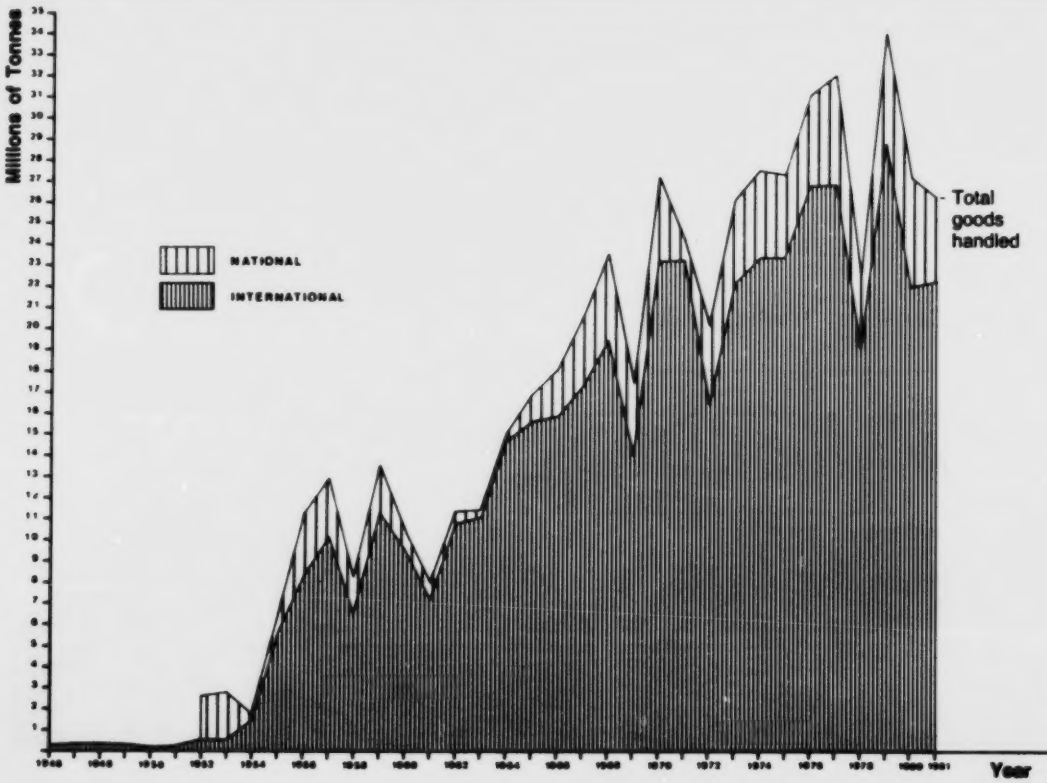


Table 11

Goods Handled, 1946-1981, Port of Québec

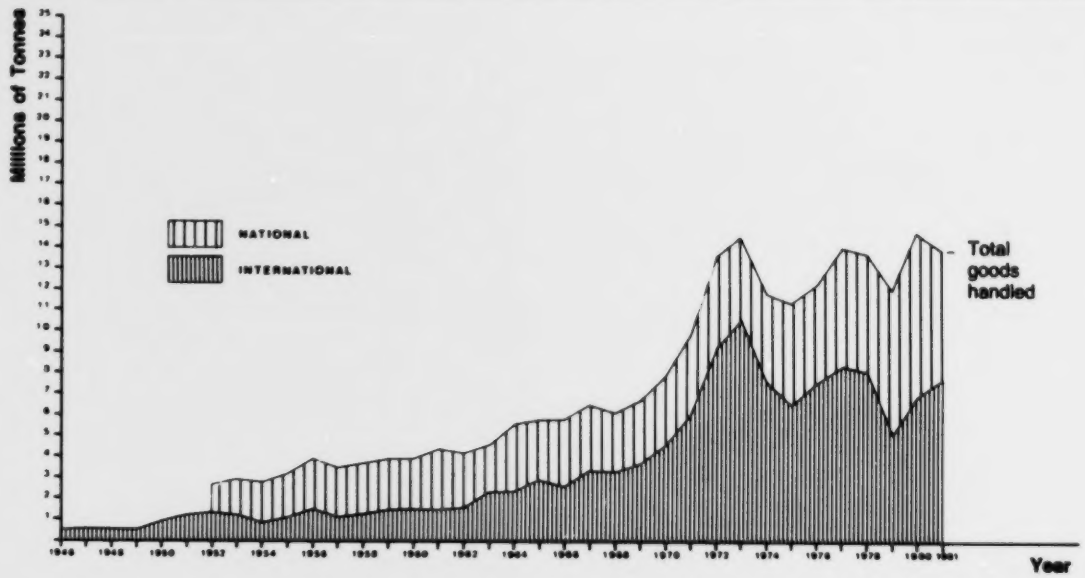
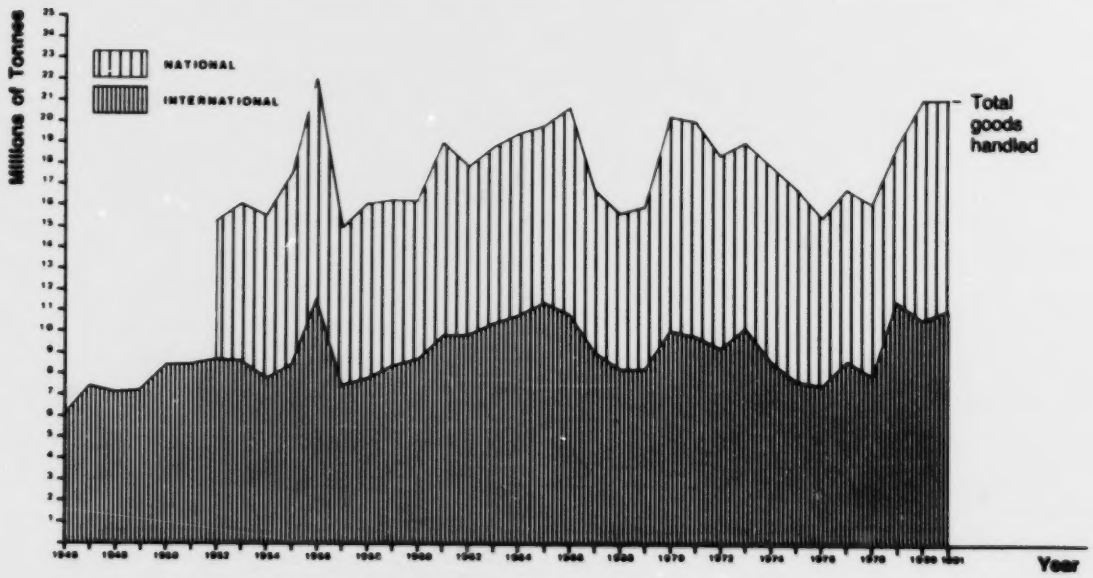


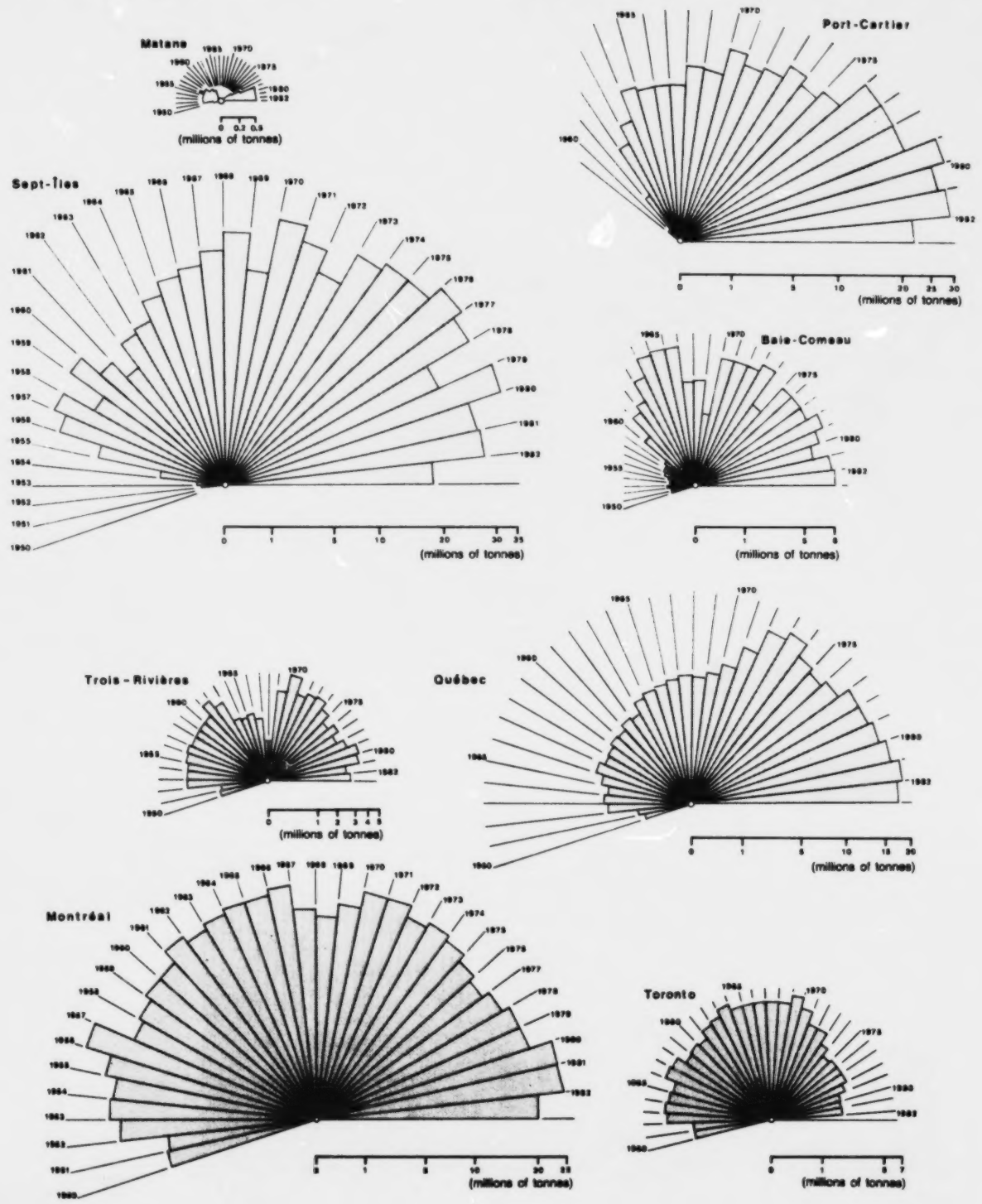
Table 12

Goods Handled, 1946-1981, Port of Montréal



Tables 13 and 14

Total Goods Loaded and Unloaded, Various Canadian Ports, 1950-1982



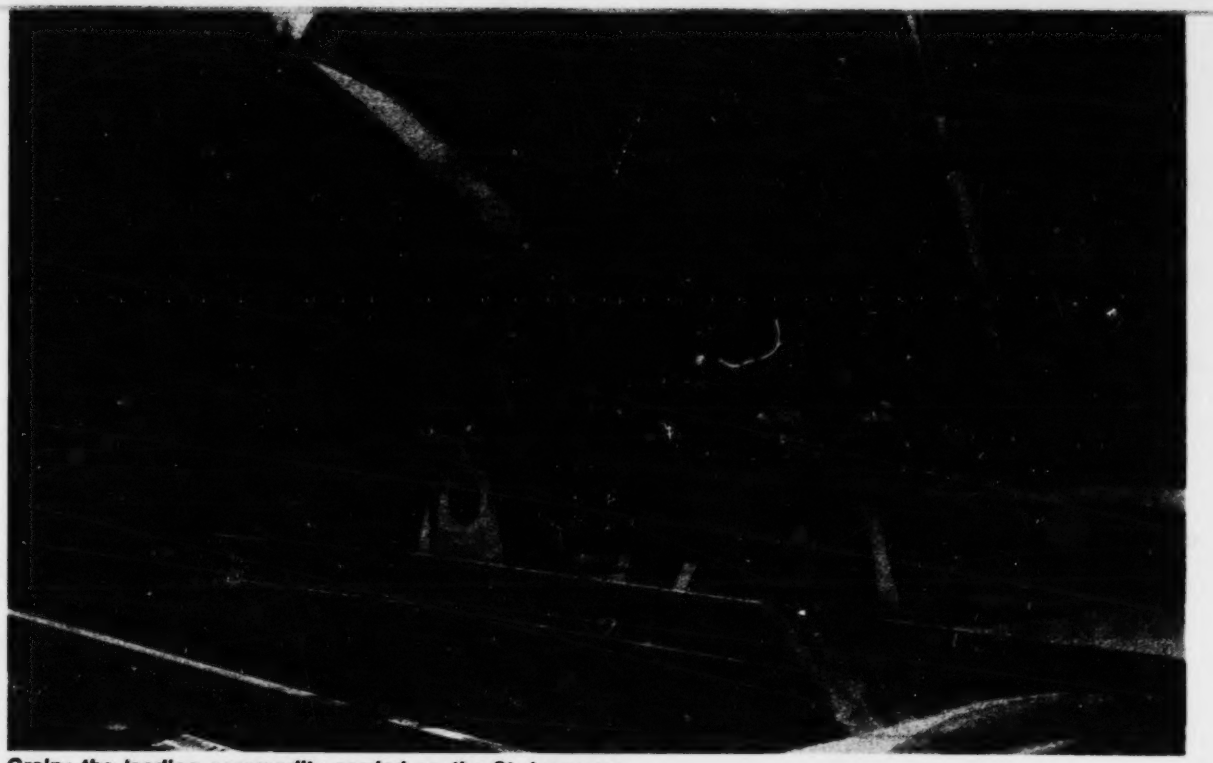


Photo: Gouvernement du Québec

Grain: the leading commodity carried on the St. Lawrence.

1.2.1 Bulk Cargo

Bulk cargo constitutes by far the greatest tonnage carried on the St. Lawrence. Indeed the question is regularly asked: will the Seaway and the port installations be able to handle increased volumes of bulk cargo?

A number of studies have been released recently in which efforts were made, for the benefit of the sponsors, to assess potential markets or possible needs in equipment. Grain, coal, sulphur and potash, for instance, were all studied. These studies provided us with much information.

In chronological order, the following studies, among others, are worthy of mention:

Dominion Bryden Ltd. et Westburn Development Consultants Ltd. (1978), *Grain Movement on the Great Lakes to 1990*. Report prepared for Dominion Marine Association.

Great Lakes/Seaway Task Force (1981), *The Great Lakes/St. Lawrence Seaway: Setting a Course for the '80s*, Toronto, Government of Ontario.

Abe, Peter W (1982), *Factors Affecting the Level of U.S. Grain Exports from the Great Lakes/St. Lawrence Seaway System*, Madison, University of Wisconsin.

Acres Consulting Services Ltd. and Data Resources Inc. (1982), *Seaway Commodity Flow Forecast 1980-2000*, Report prepared for The St. Lawrence Seaway Authority and St. Lawrence Seaway Development Corporation.

National Harbours Board, Market Studies Service (1982), *Sulphur: Economics, Marketing and Transportation. Review and Forecast to Year 2000*.

Thompson, S.R. and R.L. Johnson (1982), *Grain Transportation on the Great Lakes/St. Lawrence Seaway*, Ann Arbor, Michigan State University, Michigan Sea Grant, Extension Bulletin E-1432.

Our study is based primarily on the report prepared jointly by Acres Consulting Services and Data Resources Inc. for the American and Canadian authorities of the St. Lawrence Seaway. An analysis is made of the principal traffic on both sides of the Canada-U.S. border, with emphasis on various factors which could increase its volume. Where necessary, reference is made to other works for clarification.

Our discussion of bulk cargoes will follow the diminishing order of volumes carried on the River:

(1) grain (cereals, oil seeds, beans);
(2) iron ore;
(3) coal and petroleum products;
(4) other bulk goods (salt, alumina, etc.)

Grain

Grain accounts for the highest volume of bulk cargo exported.

North America has become the largest grain exporter in the world. In order to grasp some idea of how important the growing of grain has become in North America, the reader is referred to Tables 17 to 21, a series of maps showing zones where wheat, corn, oats, rye, barley, rice and soya are grown.

But the fact to be retained is that grain shipments head all traffic in the St. Lawrence seaway. Recently, about 43 % of the total volume shipped through the Welland Canal was made up of grain, whereas this same cargo accounted for 48 % of what travelled between Montréal and Lake Ontario.

On the same subject, Tables 15 and 16 show two graphs illustrating traffic in the two main portions of the Seaway. It will be seen that over the years grain traffic progressed considerably.

Tables 15 and 16

The St. Lawrence Seaway

Traffic by Type of Goods, 1959-1982

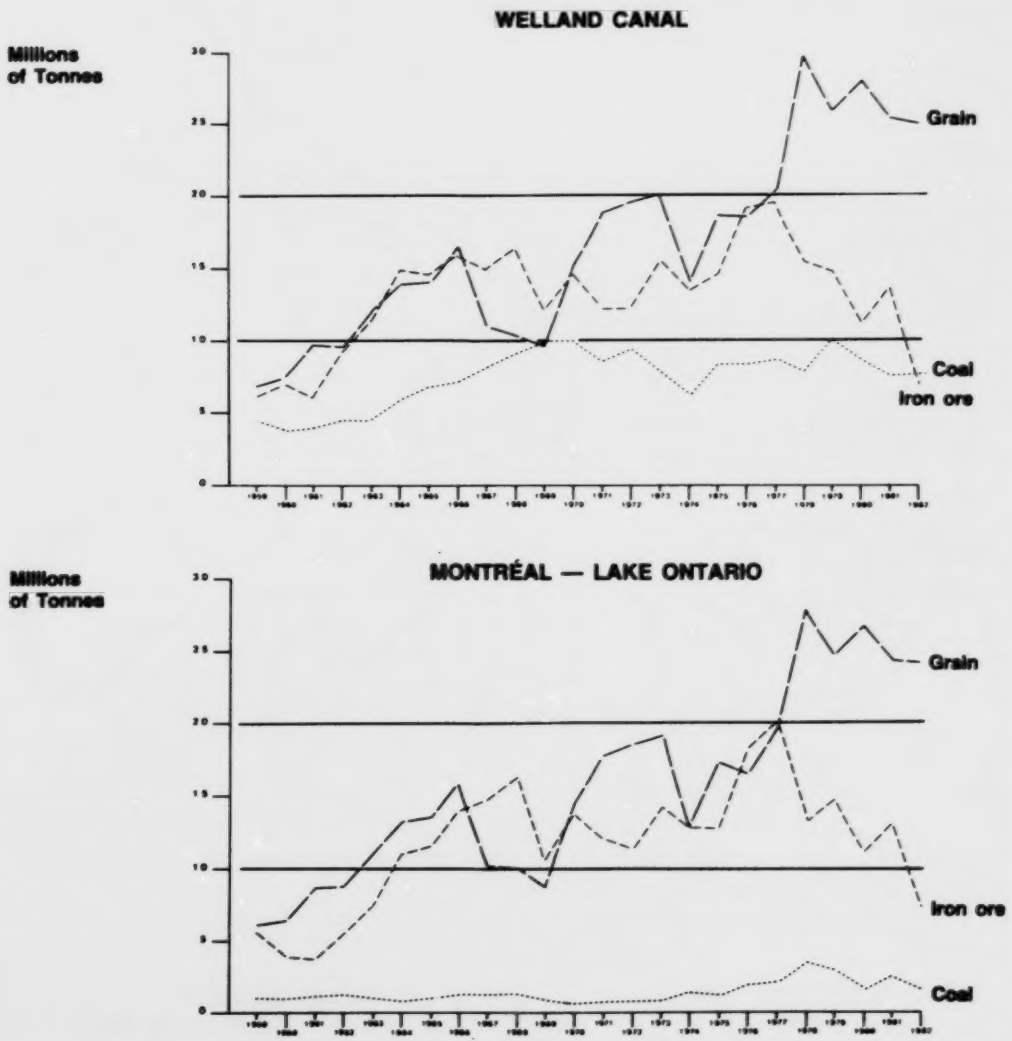


Table 17

Wheat Growing Zones

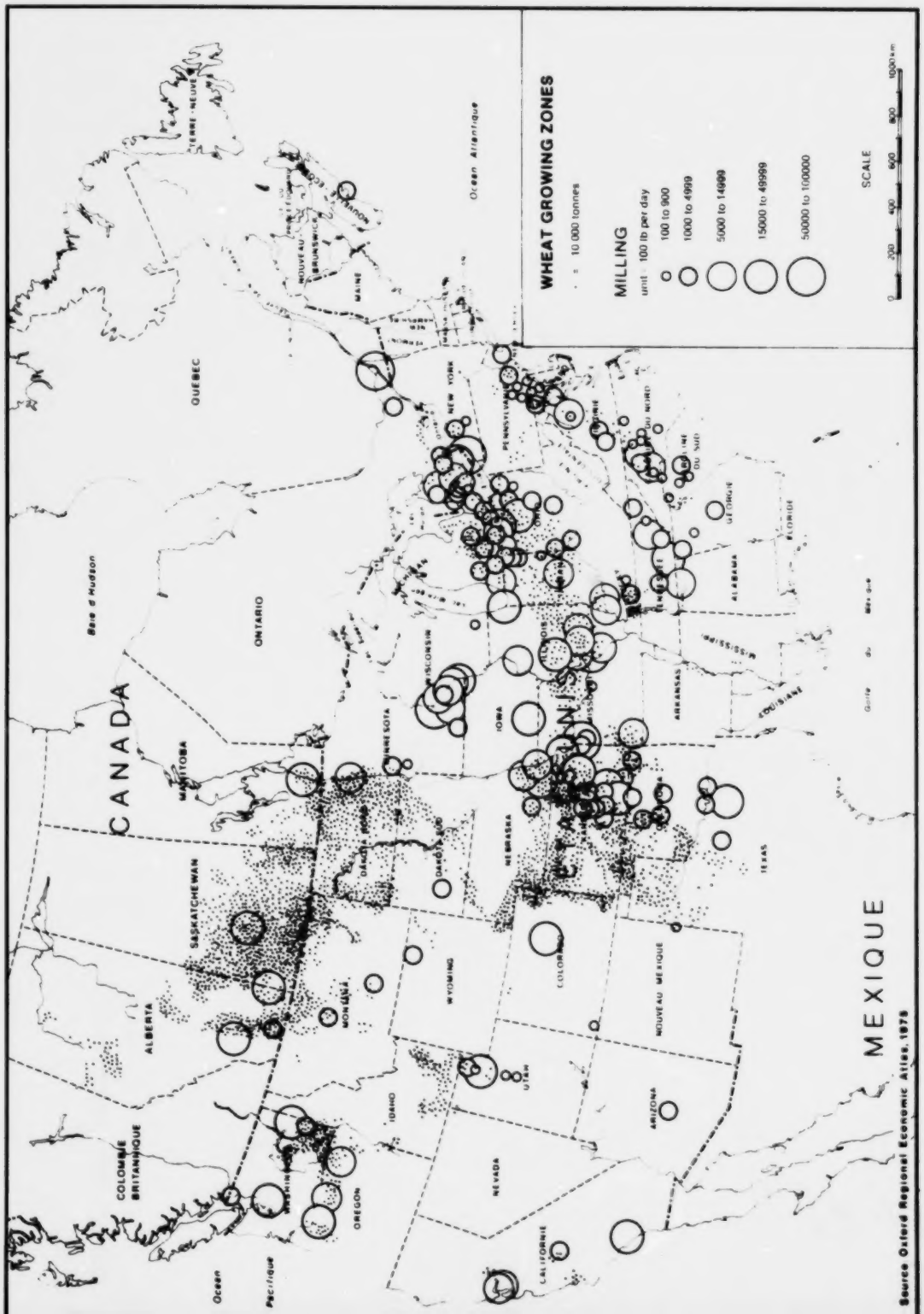


Table 18

Corn Growing Zones

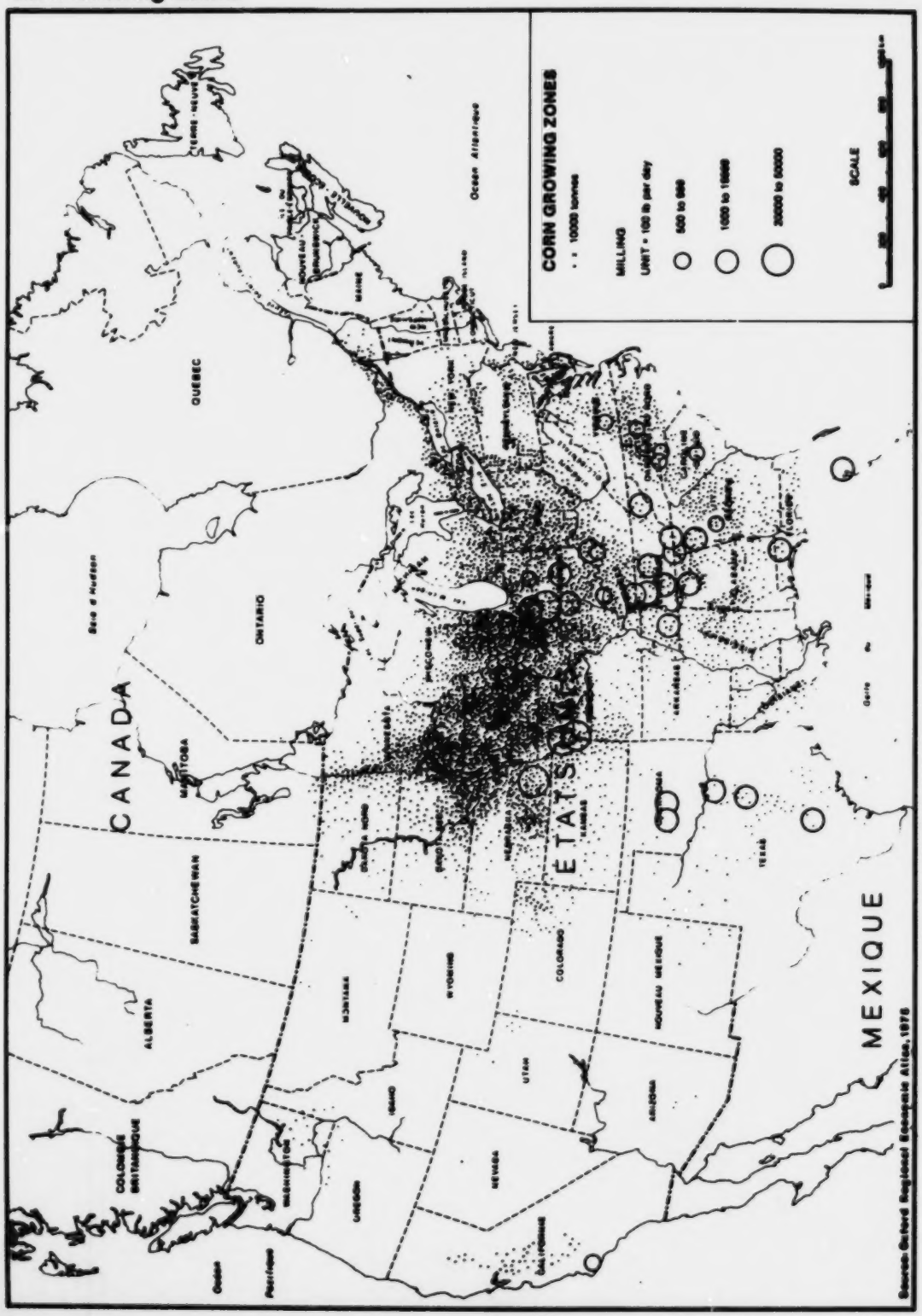


Table 19

Oats and Rye Growing Zones

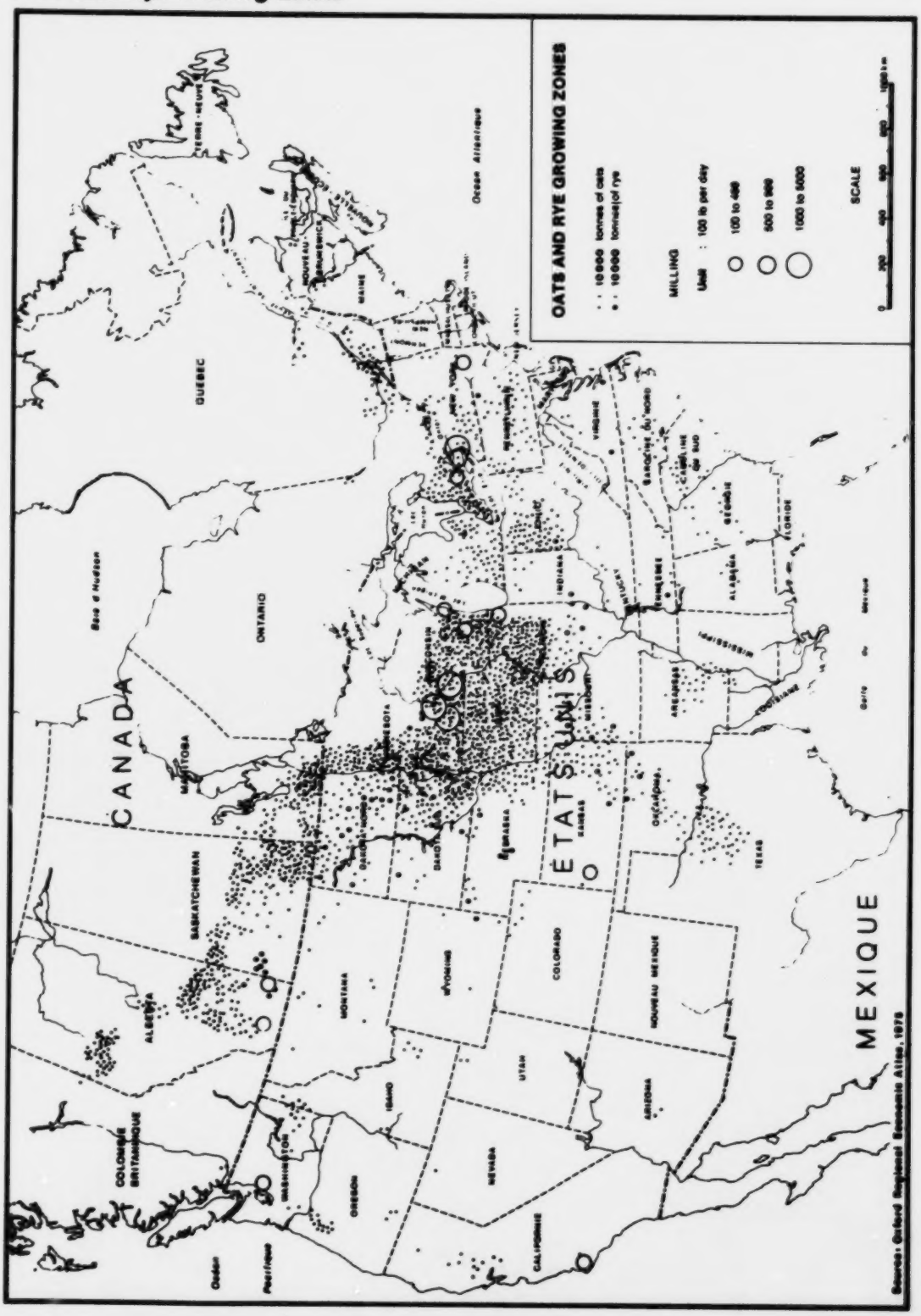


Table 20

Barley and Rice Growing Zones

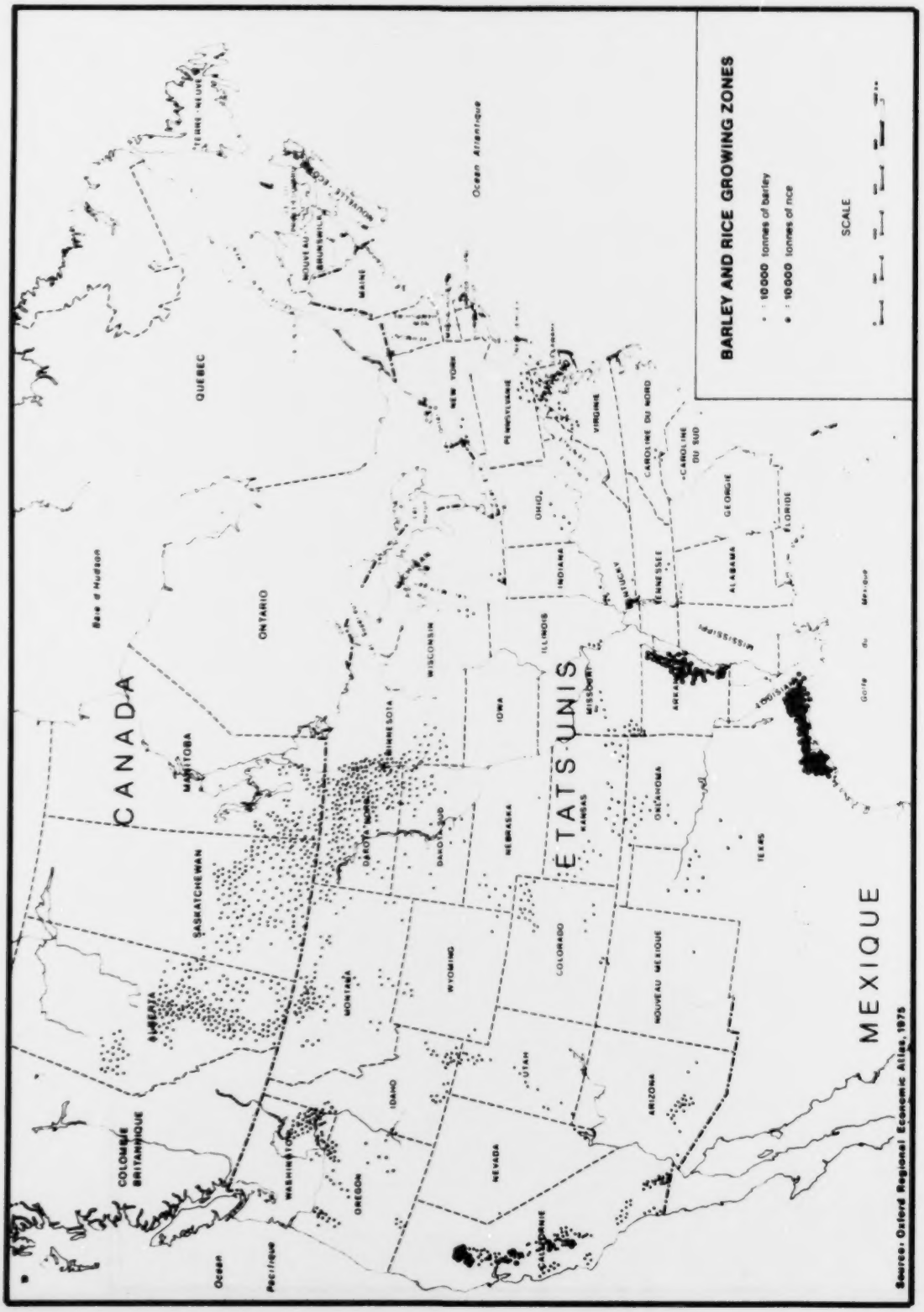
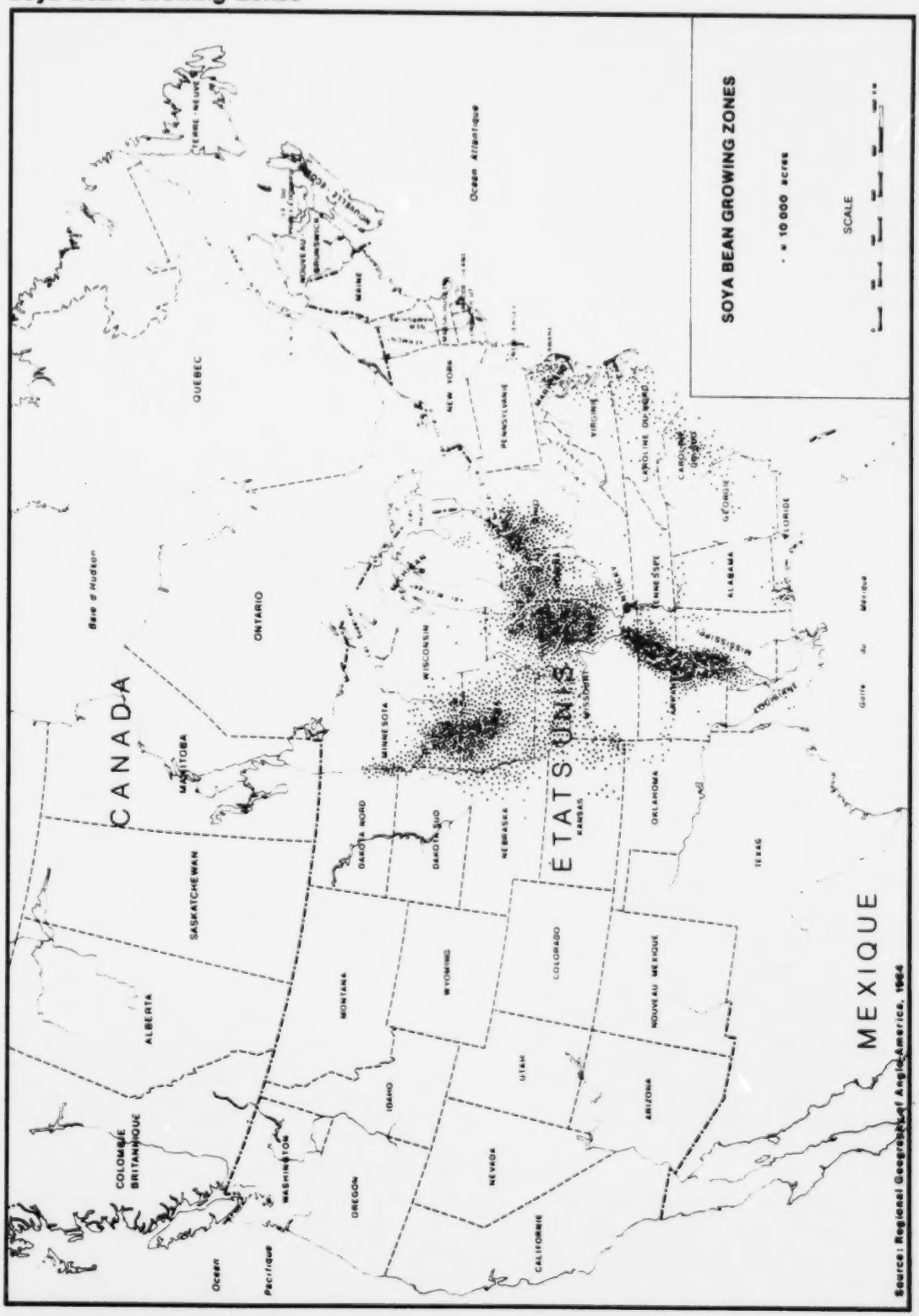


Table 21

Soya Bean Growing Zones



And grain accounts for some 25 % of the traffic in all the ports of the St. Lawrence.

Maritime grain transport may well increase over the medium term, and the complex movements involved should be looked into. For if we are truly to grasp the significance of the *Seaway Commodity Flow Forecast 1980 to 2000* it is necessary to review with the authors the main points on which that forecast is made.

To begin with, it is based on detailed projections of world production and consumption. These projections have been prepared in relation to population growth and per capita income, and to possible sources of supply.

Once we are familiar with import demand, and having analysed production, domestic consumption and exports in Canada and the U.S., it is possible to forecast fairly accurately what Canada's and the United States' contribution might be to world trade.

Next, the volume of traffic in the Seaway is assessed on the strength of volumes already exported and of their destination — the traditional Seaway traffic. Finally the assessment is based on estimated changes in logistic costs and in alternate routes.

For statistical purposes, grain is usually subdivided into four categories: wheat (hard and soft), coarse grains (corn, oats, barley, rye, sorgho and, in Canada, grain siftings), oil seeds (soya, canola, flax and sunflower), and dried peas and beans (although the latter do not count for much on the St. Lawrence). Because of their special importance in American production, corn and soya beans are treated separately for statistical purposes.

At the basis of the studies we are using is an econometric model, the Michigan State University Agricultural Model or MSU model[1], a detailed model for the United States and a model for each of nine regions of the world. To these models the consultants have added an exhaustive analysis for Canada.

From the resulting (MSU) model, the following importing and exporting regions were selected by Acres Consulting Services Ltd. and Data Resources Inc.:

Regions	Wheat	Coarse Grain	Soya
Exporting Regions[2]			
Canada	X	X	
Australia	X	X	
Argentina	X	X	X
Brazil			X
United States	X	X	X
Importing Regions			
Developed countries[3]	X	X	X
Centrally planned economies	X	X	X
Developing nations[4]	X	X	X
China	X	X	X
All other countries[5]	X	X	

The Outlook

World grain production is expected to increase considerably, rising between now and the year 2000 from 1 158 to 1 936 million tonnes: a 67 % increase in production. This increase will probably be the result primarily of a 58 % increase in wheat production and a 73 % rise in coarse grain production.

Production in the four main producing regions (United States, Canada, Australia, Argentina) is expected to increase by 76 %, whereas production in the importing regions is expected to increase by only 64 % in the same period.

When one knows *per capita* consumption both in the importing and in the exporting regions, one can forecast the flow of exports from the United States and Canada.

1 The St. Lawrence Seaway Authority is bringing an appropriate model up to date on transportation planning proper. An initial version was presented by M.H. Ghonima at a symposium entitled "The Seaway Economic Planning System", held in Jasper in May 1984, under the aegis of the Canadian Transportation Research Forum.

2 Not including European exports.

3 Western Europe, Japan, Israel, South Africa and New Zealand.

4 The Caribbean, Latin America, Africa, the Middle East, the Far East, South-East Asia.

5 Representing only 5 % of the market.

Between 1980 and 2000, net exports from the United States will increase (in millions of tonnes) from:

- 42.0 to 73.2 for *wheat*;
- 74.1 to 154.0 for *coarse grains*;
- 26.8 to 57.6 for *soya beans*;
- and slightly (a few million tonnes) for *sunflower seeds*.

And exports from Canada will increase (again in millions of tonnes) from:

- 16.0 to 24.5 for *wheat*;
- 3.0 to 12.7 for *coarse grains*.

So the United States and Canada would capture roughly 80 % of the wheat and coarse grain export market, with the United States alone providing for 70 % of the soya bean market.

As for the importing regions, the three first (developed countries, centrally planned economies and the developing nations) would share the grain exported in the year 2000 in the following proportions:

	Wheat	Coarse Grain	Soya
Developed Countries	—	35 %	62 %
Centrally planned economies	23 %	21 %	21 %
Developing nations	53 %	40 %	13 %

Even though grain trade can fluctuate and can be subject to political or economic factors which are difficult to weigh[1] (the embargo placed by the U.S. on grain shipments to the U.S.S.R. following the invasion of Afghanistan; the indebtedness of developing nations), if the routes taken by North American exports are to be assessed, a plausible market scenario remains essential.

Now we must turn our attention to this evaluation and try to define, step by step, transportation and trade by way of the St. Lawrence and the Great Lakes.

North American Grain Transport

It can be assumed that grain will be moved by the most economical route, which in this case means the shortest of several possible water routes.

However, it is a known fact that the logic of commerce is more complex. For example, routes are determined by the place of origin and the destination of cargoes, but the shortest route is not necessarily the most economical one, and vice versa. Even if, all other conditions being equal, transport by water is in principle more economical than by rail, which in turn is more economical than road transport, it is possible that there are advantages in one or other of these modes which could change the basic or standard terms of competition.

In Canada, for instance, the Crow rate[2], like the At and East rates[3], is under revision. It cannot be taken for granted that the present situation will last or that the outcome of the revision will sanction any particular advantage. But a great deal is at stake in the changes that can be foreseen in transport costs and choices. Vigilance is essential so that the effect of any new rate, or of the withdrawal of government support and, if need be, of alternatives to this support, can be studied as early as possible.

Any subsidy or additional charge, whether direct or hidden, which affects one type of transportation or another, changes the rules of competition between these modes and may even affect the validity of any planning with regard to a particular type. Just as a stable labour force could give a clear advantage to a costly transportation mode in that a guarantee of delivery would mitigate the higher cost, so any necessary increase in the number of transhipments along the route could wipe out the apparent advantages of any one of the various types.

It goes without saying that the general economic situation may also have a profound effect on maritime transport. For instance, in times of economic recession transport companies will, if there is an over-capacity of carriers, try to avoid return trips with empty hulls by temporarily cutting prices to the minimum. Some companies barely charge enough to cover their fuel costs, with apparent disregard for the financial risks involved.

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1 In this respect, see Terry Veeman and Michèle Veeman (1984), *The Future of Grain*, Ottawa, Canadian Institute for Economic Policy, pp. 31-33.

2 Favourable rates established in 1897 for carrying export grain from western Canada.

3 Compensation paid by the federal government to rail companies which transport certain types of grain at 1960 rates between Georgian Bay and ports east of Montréal.

Other important factors in developing transportation modes or routes are advertising, promotion, ownership of equipment, services provided and the reliability of these services. If the advantages of a particular water route could not be vouched for, that route would certainly fall into oblivion or at least attract little traffic. To be compelled to use the equipment of a competitor is also a factor which could influence the choice of route. But there is no need to mention all the imponderables. It is more important to determine clearly the basic characteristics of the transportation of North American export grain and to identify those factors that could work to the advantage of the St. Lawrence and the Great Lakes.

Major Arteries

Table 22 shows the major routes by which grain is exported from Canada and the U.S., based on 1981-1982 data.

In volumetric order of importance, the main exit routes for Canadian and U.S. grain are as follows:

— the Gulf of Mexico;
— the Pacific coast;
— the St. Lawrence and the Great Lakes;
— the Atlantic coast.

The Mississippi is the main competitor of the St. Lawrence in the transportation of grain; in fact, Mississippi grain traffic is twice that of the St. Lawrence.

If we examine all grain transport on the St. Lawrence and the Great Lakes, (that is, Canadian and international traffic), the result for 1982 is as follows.[1]

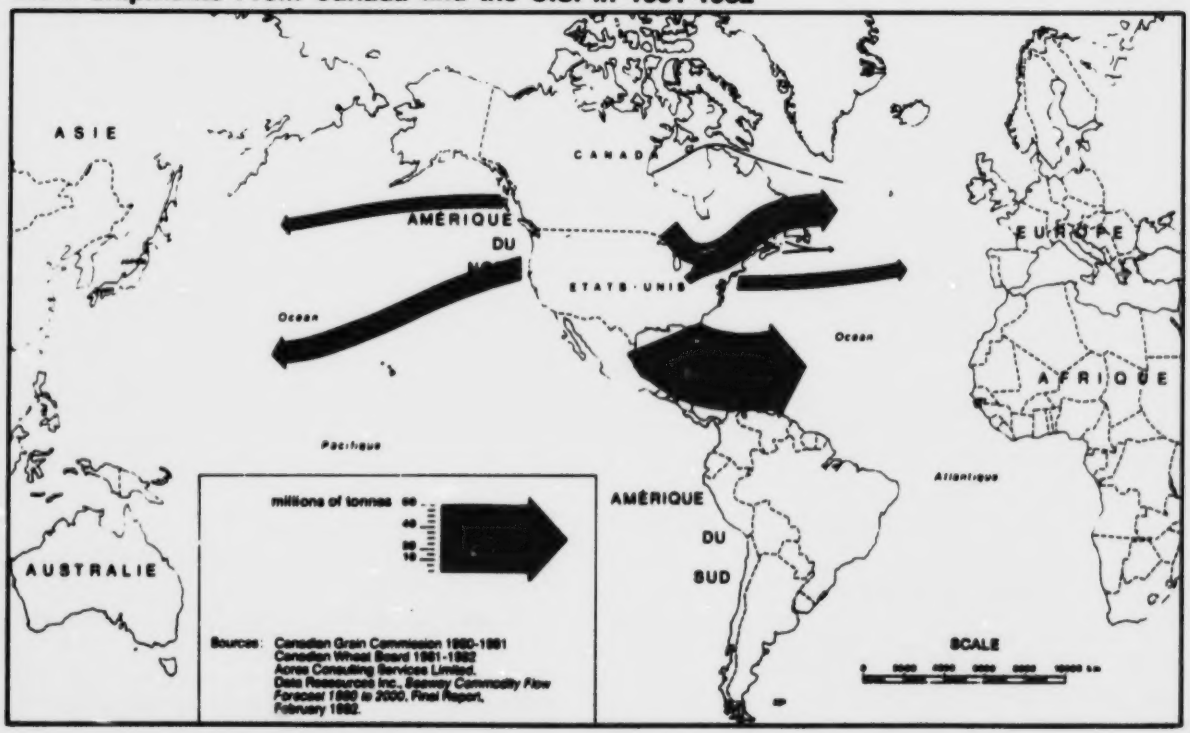
In the first case, Canadian traffic consists essentially of shipments from Thunder Bay to other Ontario ports and to Québec ports (see Table 23).

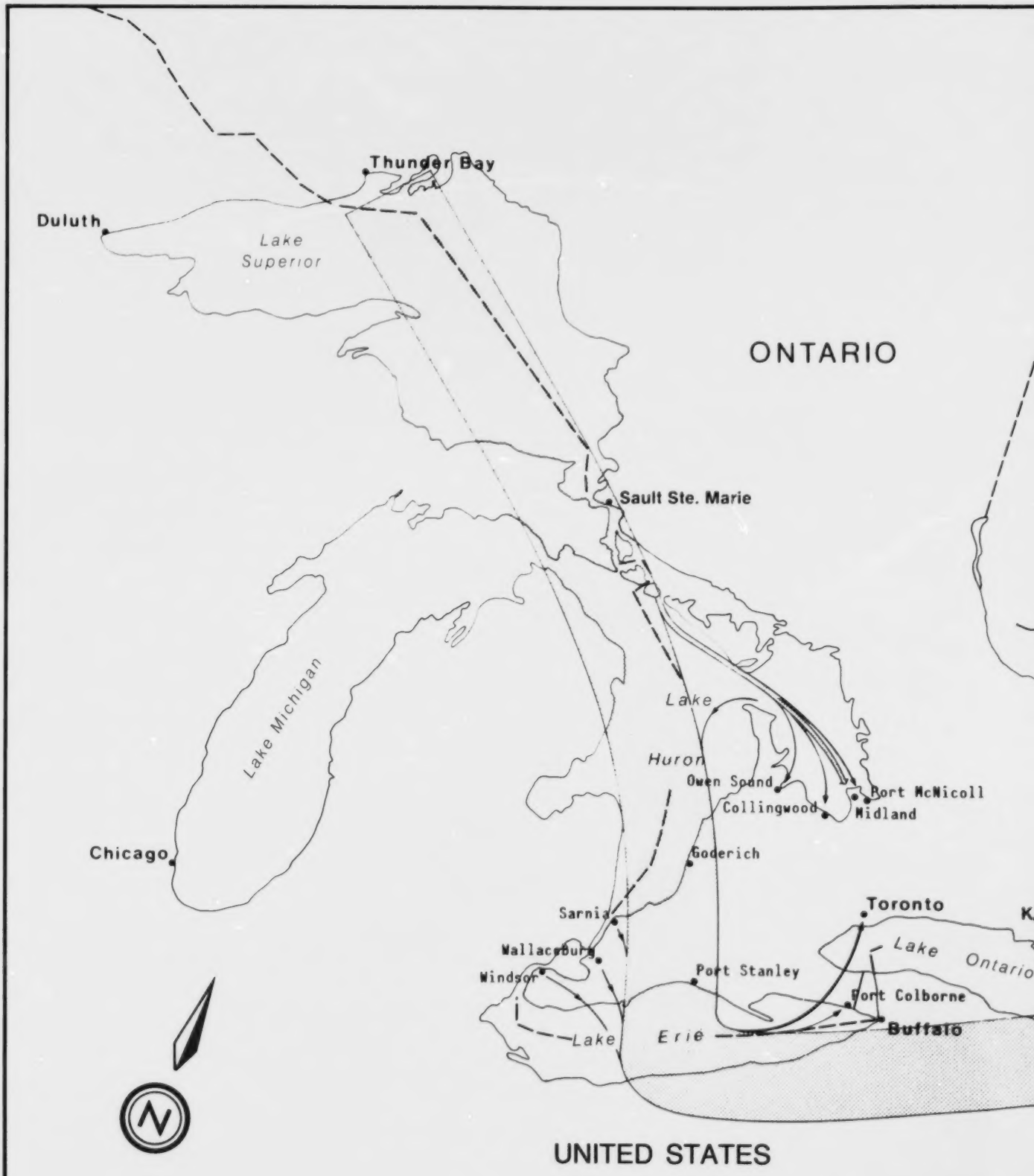
In the case of international traffic, the movements are of course much more complex. The grain is, for the most part, shipped from various points on the Great Lakes to Québec ports. Only a small portion is shipped direct to overseas destinations (see Table 24).

1 For Statistics Canada, Canadian traffic occurs between Canadian ports, while international traffic occurs between Canadian ports and foreign ports (including American ports on the Great Lakes).

Table 22

Grain Shipments From Canada and the U.S. in 1981-1982





SOURCE: Data from Statistics Canada, Table II

The St. Lawrence/Great Lakes System
National Grain Traffic, 1982

THE ST. LAWRENCE/GREAT LAKES SYSTEM

NATIONAL GRAIN TRAFFIC, 1982

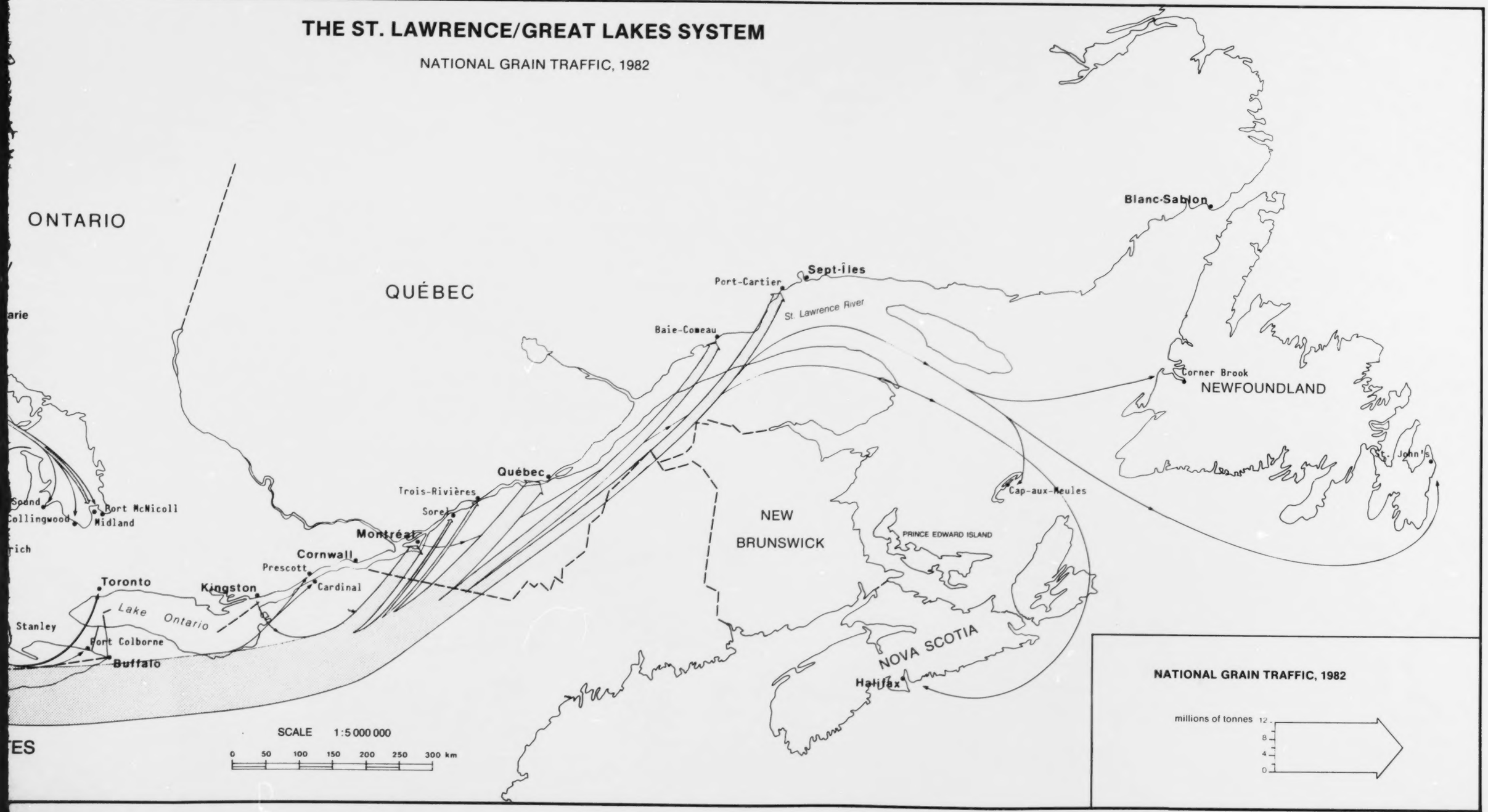


Table 24
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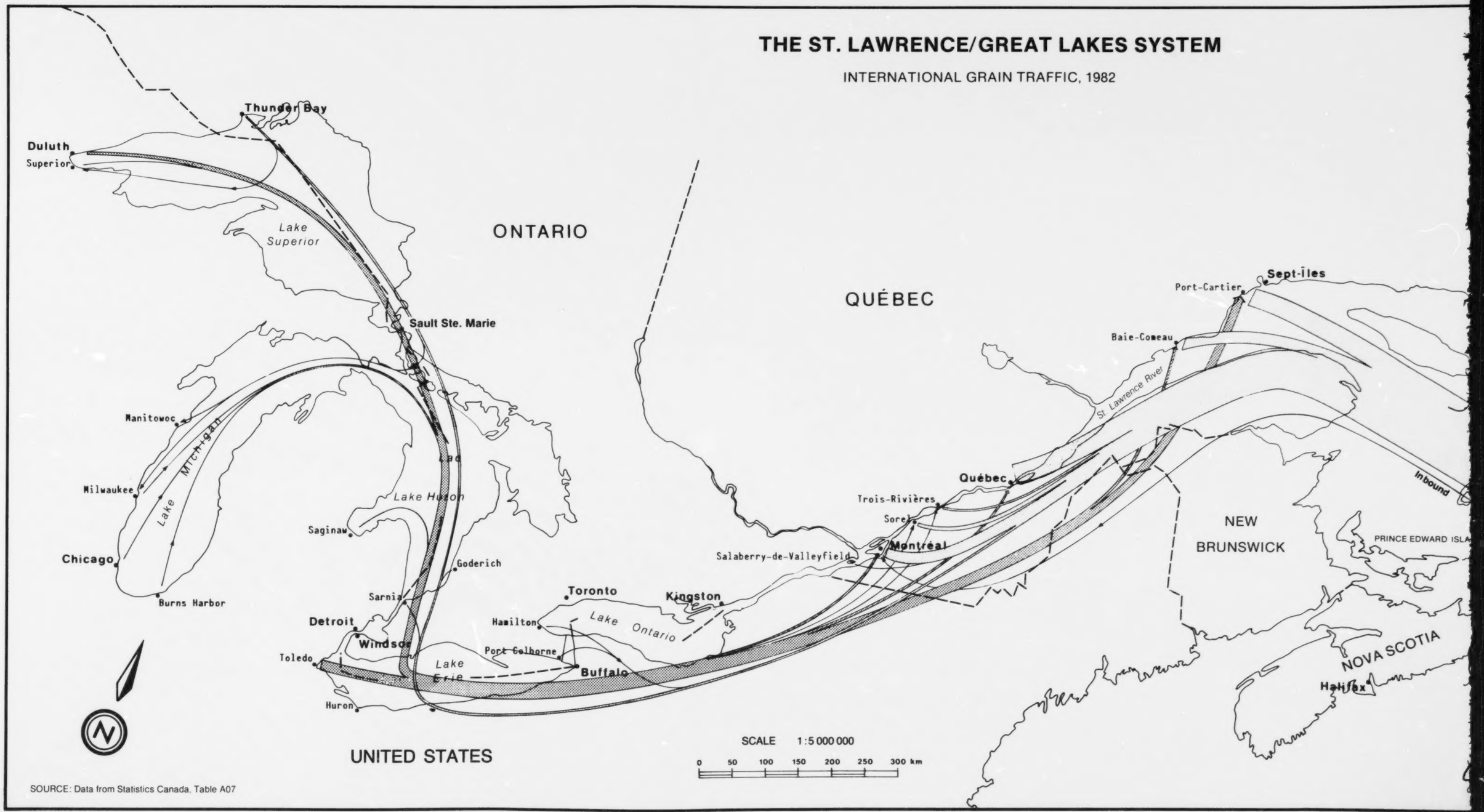
THE ST. LAWRENCE/GREAT LAKES SYSTEM

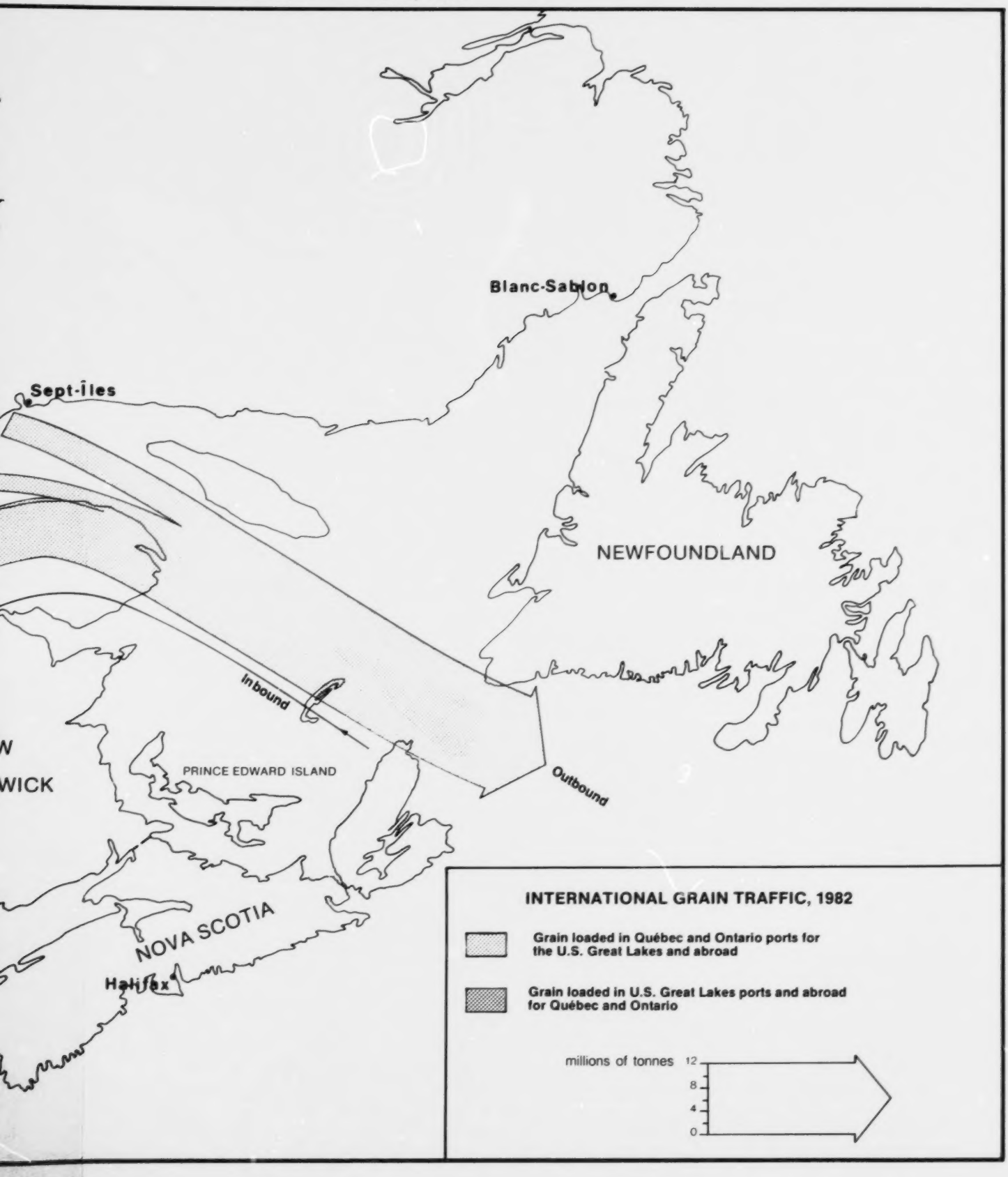
INTERNATIONAL GRAIN TRAFFIC, 1982



SOURCE: Data from Statistics Canada, Table A07

Table 24

The St. Lawrence/Great Lakes System
International Grain Traffic, 1982



What will happen to this traffic if we now take into consideration the forecasts of increased exports between 1980 and the year 2000?

The answer to this question must be that the St. Lawrence and the Great Lakes as well as Québec will benefit even more if we make the most of the Seaway's inherent advantages and if we do not neutralize these advantages by imposing harmful or excessive restrictions such as undue charges on users.

We must not therefore simply accept the changes that will occur, but promote measures of benefit to Québec. It is for this reason that we are delving deeper into this study of grain transport on the St. Lawrence and the Great Lakes. No need to mention again that grain traffic is the major commercial activity on the St. Lawrence and the Great Lakes. What is more this traffic should increase in the decades to come.

We will deal in turn with the growth in shipments of Canadian and American grain through the Seaway and, in each case, we will have to consider transportation costs.

Canadian Grain

Canadian export grain comes mainly from the west. Only recently has Ontario begun to export corn.

Canadian grain is exported to Eastern and Western Europe, to Africa, the Mediterranean countries, Asia and other countries of the Americas. This means that between 10 and 15 million tonnes of Canadian grain leave the Seaway for very disparate regions.

Over the last twenty years, there have been some noteworthy changes in the relative size of Canada's overseas grain markets. Western Europe's share has decreased regularly and significantly, dropping from 40 % to 14 %. Africa's share has grown, first from 5 % to 7 %, then from 7 % to 15 %, while that of the Americas has almost doubled, increasing from 7 % to 13 %. The most stable market is Asia (excluding China), which remains steady at about 23 %.

Table 25 illustrates these changes with diagrams from Statistics Canada.

These changes in our overseas markets could give the impression that fluctuations in grain shipments inside Canada between the west and east coasts were substantial. But this was not the case. Internal flows to either coast scarcely changed between 1960 and 1980, as the chart in Table 26 shows.

This balance in east-west grain traffic suggests that the distribution is not necessarily affected by changing markets. It is easy to see that the distribution could more directly depend on the availability of elevators in the ports of departure, on the state of equipment and on the presence of an adequate work force in these ports, or for that matter on agreements between the parties involved.

In general, the directional distribution of shipments or the volume of traffic should quite simply depend on the prevailing economic difficulties or advantages. For instance, the availability of empty hulls can be turned to account by increasing the number of backhaul loads. It is estimated that downbound grain transportation on the St. Lawrence derives enormous profit — up to 40 % of the costs — from the upbound transportation of iron ore from Labrador. Moreover, a change in the Crow rate or in the At and East rates could affect the movement of grain just as much as, if not more than, changing markets.

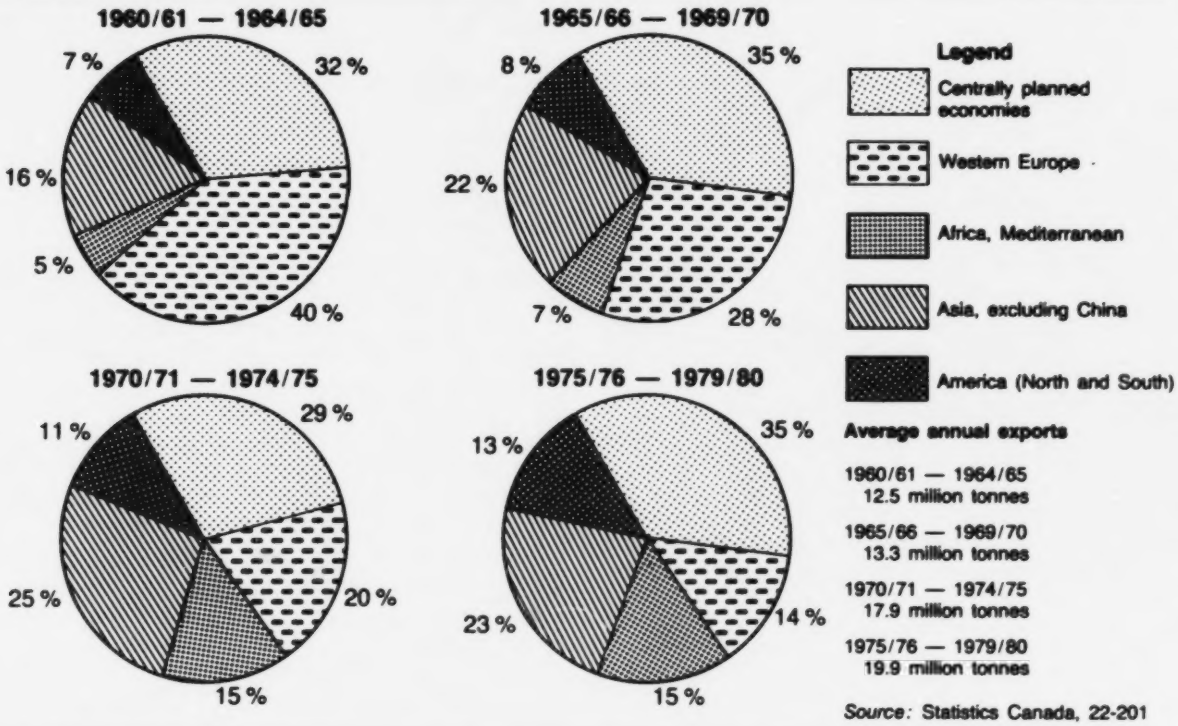
All things considered, this balanced distribution is surprising and might give the impression that the Canadian Wheat Board and the rail companies which ship grain to the ports have come to some agreement on the matter.

Using the strong trends of the past to forecast the future flow distribution between western and eastern Canada, and taking into account the demand already projected — as the authors to whom we referred have done —, we obtain the results shown on Table 27 relating to grain exports from the Prairies.

Not suprisingly, Table 27 shows that the total tonnage would be distributed equally between east and west, except that wheat would more likely be shipped by the Pacific route and coarse grains by the Atlantic route.

Table 25

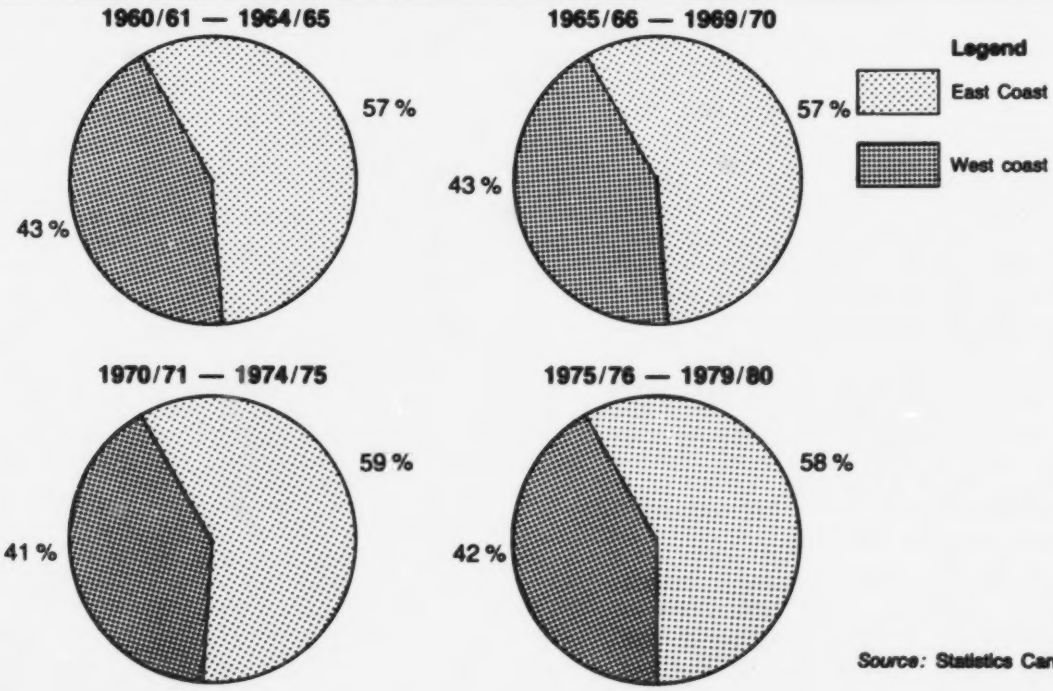
Canadian Grain Exports by Market Area
(millions of tonnes)



Source: Statistics Canada, 22-201

Table 26

Canadian Grain Exports — Export Clearance Sector



Source: Statistics Canada, 22-201

The volume of export grain from the east (corn, wheat, soybeans), especially from Ontario, would increase from 0.8 million tonnes in 1980 to 3.9 million tonnes in the year 2000.

From the considerable data already assembled, we can estimate what the real volume of traffic through the Seaway will be.

To do this, data on domestic grain consumption must first be added to data on exports. This is simple enough since, in all probability, domestic consumption will remain stable at between one and two million tonnes. The results are shown in the form of a table of potential traffic (Table 28) which is taken from the same source, i.e., the *Seaway Commodity Flow Forecast 1980 to 2000.*

Table 27

Directional Flows of Western Export Grain
(millions of tonnes)

	1985	1990	1995	2000
Eastern Clearance				
Wheat	8.0	8.9	10.4	11.5
Coarse grains	3.6	5.0	6.1	7.1
Oil seeds	1.3	1.5	1.6	1.8
Total	**12.9**	**15.4**	**18.1**	**20.4**
Pacific Clearance				
Wheat	8.2	10.0	11.5	13.0
Coarse grains	2.8	4.3	4.9	5.6
Oil seeds	1.2	1.5	1.7	1.8
Total	**12.2**	**15.8**	**18.1**	**20.4**
Grand Total	**25.1**	**31.2**	**36.2**	**40.8**

*Source: Acres Consulting Services Ltd., and Data Resources Inc. (1982), *Seaway Commodity Flow Forecast 1980 to 2000*, p. 3-120.

For a more accurate picture of the volume of traffic likely to pass through the Seaway, we must next look at costs — the main factor in determining the choice of routes, which in this case are numerous.

Costs include those for transportation and handling as well as interest charges which are based on the duration of the journey. For the purposes of comparison, we can confine ourselves to the variable costs of long-distance transport and assume that the carriers' profit margin or administrative expenses may be deferred when competition is intense.

Naturally, uncertain fuel prices could affect the calculation of costs. On this point, we can do no better than refer to the official forecasts of Energy, Mines and Resources Canada as the authors of the study have done.

Following are the routes which can be used to move export grain from western to eastern Canada:

Route A: direct by ocean vessel from Thunder Bay

Route B: by laker from Thunder Bay to the St. Lawrence, then by ocean vessel

Route C: by ship from Thunder Bay to Georgian Bay, then by rail to the Atlantic ports

Route D: direct by rail from the Prairies to the St. Lawrence ports

Route E: by rail from Thunder Bay to the St. Lawrence ports

Route F: by rail from the Prairies to Churchill, then by ocean vessel.

Table 28

Potential Seaway Flows
(millions of tonnes)

	1985		1990		1995		2000	
	MLO[1]	W[2]	MLO	W	MLO	W	MLO	W
Exports of western grain to eastern markets	12.9	12.9	15.6	15.6	18.1	18.1	20.4	20.4
Exports of eastern grain	2.1	2.1	2.7	2.7	3.4	3.4	3.9	3.9
Domestic movements, western grain	1.1	1.9	1.1	2.0	1.1	2.0	1.2	2.1
Domestic movement, eastern grain	1.1	1.1	1.2	1.2	1.4	1.4	1.4	1.4
Total potential	**17.2**	**18.0**	**20.6**	**21.5**	**24.0**	**24.9**	**26.9**	**27.8**

*Source: Acres Consulting Services Ltd., and Data Resources Inc. (1982) *Seaway Commodity Flow Forecast 1980 to 2000*, p. 3-120.

1 MLO: Montréal-Lake Ontario section
2 W: Welland section

In the case of route F, annual exports have, up to the present, been maintained at about 0.6 million tonnes. The authors forecast that this figure could reach 0.8 million tonnes in 1985 and one million tonnes thereafter.

Route C has generally attracted only 5 % of total grain exports. If this figure were to be maintained, the forecast for traffic on this route would have to be increased to about 1.3 million tonnes in 1985 and gradually to 2 million tonnes in the year 2000. But it should be pointed out that at present the At and East rates favour traffic using route C since the 1960 rates still apply between Georgian Bay and ports east of Montréal, the federal government compensating the railway companies. If the rates are revised, and it seems that this will happen very soon, the forecasts from our principal source will have to be adjusted.

If the general forecasts for grain exports from the west to the east are deducted from the forecasts for route F and C, the volumes remaining for routes A, B, D and E, which are given below, must still be discussed:

1985	10.8 million tonnes
1990	13.0 million tonnes
1995	15.3 million tonnes
2000	17.4 million tonnes.

More concrete scenarios will be used to conduct an in-depth analysis of routes. For route B, two options are proposed.

Route A: Ocean vessel of 20 000 tonnes direct from Thunder Bay to Rotterdam, with no backhaul cargo.

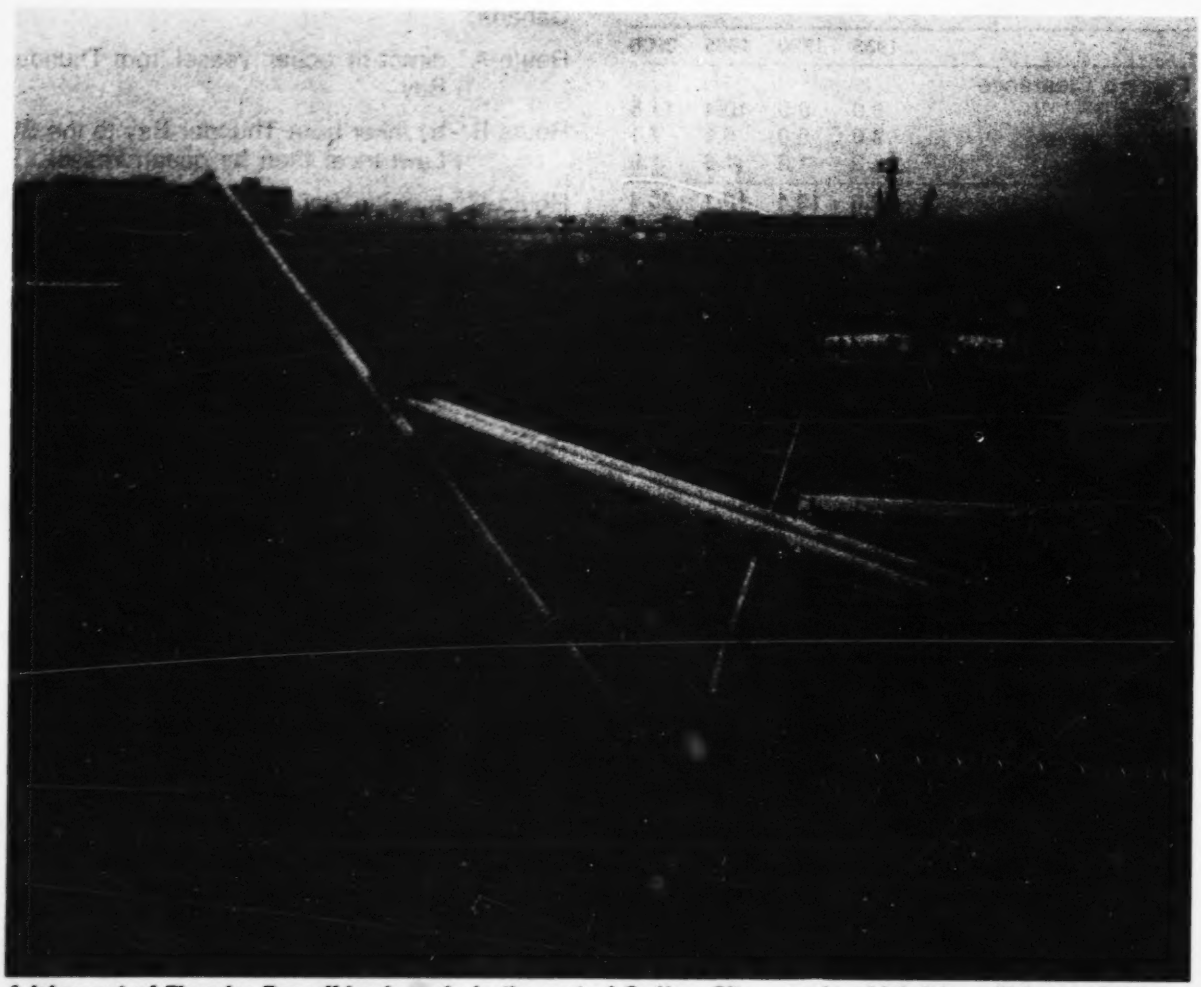


Photo: John Hutchinson

A laker out of Thunder Bay off-loads grain in the port of Québec City — grain which later will be carried by ocean vessel to the country importing it.

Route B: (hypothesis B_1) Maximum-size laker (220 m) from Thunder Bay to Québec City, with no backhaul cargo between Québec City and Thunder Bay; 80 000-tonne ocean vessel to Rotterdam.

Route B: (hypothesis B_2) Maximum-size laker (220 m) from Thunder Bay to Port-Cartier with backhaul cargo of iron ore in 50 % of the voyages; 100 000-tonne ocean vessel to Rotterdam.

Route D: Rail direct from the Prairies to Québec City; 80 000-tonne ocean vessel to Rotterdam.

Route E: Rail from Thunder Bay to Québec City; 80 000-tonne ocean vessel to Rotterdam.

Table 29 gives cost comparisons based on 1981 prices for wheat transport.

It can be seen from the route options considered that in 1981 the transportation cost by laker from Thunder Bay (route B) to either Québec City (option B_1) or Port-Cartier (option B_2) was almost the same. The cost through Port-Cartier could be increased or reduced depending on the percentage of iron ore backhaul cargoes or on the size of vessel used for the journey to Rotterdam.

Direct transport by small ocean vessel from Thunder Bay (route A) was more expensive than options B_1 and B_2 (route B). Transportation by rail from Thunder Bay to Québec City, then by ship of 80 000 tonnes to Rotterdam (route E) was even costlier. Of all the routes considered, route E was the most expensive. It should be noted however that in spite of their costs, routes A, B_1 and E still offer advantages for soft-currency countries. Since these countries pay their crews in national currencies, they prefer to take delivery of their grain as far up the St. Lawrence-Great Lakes system as possible.

In the case of routes D and E, grain is shipped by rail to the St. Lawrence ports from the Prairies (route D) or from Thunder Bay (route E). According to the Acres Consulting Services Limited and Data Resources Inc. report, if we look only at variable costs, transportation from the Prairies (route D) in 1981 would have been less costly than from Thunder Bay (route E). Furthermore, of all the options and routes the most advantageous is by rail from the Prairies to Québec City and from there by ocean vessel of 80 000 tonnes to Rotterdam (route D).

The last part of this presentation remains highly problematical and we would like to review it before commenting on the report's conclusions.

The Acres and Data Resources report compares different routes between Thunder Bay and Rotterdam (routes A, B_1, B_2 and E) and one route (route D) between the Prairies and Rotterdam. For this purpose, it was assumed that costs for rail transport between the Prairies and Thunder Bay were the same for all the routes, only route D being exempt from handling costs at Thunder Bay.

Table 29

Comparison of Costs: Wheat from Thunder Bay to Rotterdam
(1981 cost levels, $/tonne, Canadian)

Route	A	B		D	E
Hypothesis		B_1	B_2		
Handling at Thunder Bay	$3.50	$3.50	$3.50	—	$4.30
Laker to port of departure	—	$13.60	$13.55	—	—
Rail to port of departure	—	—	—	$15.65	$15.65
Handling at port of departure	$1.13[1]	$3.20	$3.20	$4.05	$4.05
Ocean vessel (with "top-off" on the St. Lawrence)	$11.80	—	—	—	—
Ocean vessel to Rotterdam	$16.69	$11.05	$10.95	$11.05	$11.05
Total	**$33.12**	**$31.35**	**$31.20**	**$30.70**	**$35.05**

1 Cost of topping-up spread over total tonnes carried.

Source: Acres Consulting Services Ltd. and Data Resources Inc. (1982), *Seaway Commodity Flow Forecast 1980 to 2000*, p. 3-136.

If comparison of the four Thunder Bay-Rotterdam routes and of the Prairies-Rotterdam route proposed by the report is to be taken literally, it would no doubt be necessary to add to route D the 1981 cost of preparing export grain as established by the Canadian Grain Commission (about $3.00 per tonne of wheat). In this case, rail transport from the Prairies to Québec City (route D) would be less costly than from Thunder Bay to Québec City (route E). Route D would however be more expensive than routes A, B_1 and B_2.

The comparisons of the five options could thus be distorted by comparison of disparate elements. So we thought that the table should be corrected to take into account the entire Prairies-Rotterdam journey for each of the five scenarios. Moreover, since ocean freight costs have decreased by more than $4.00 per tonne since 1981, we had to take 1983 prices into consideration. The results of these revisions appear in Table 30.

This revision leads to results that are very different from those that appear in the table of the Acres and Data Resources report. There are two reasons for this: (1) we had to change the bases of comparison to make them similar, which in reality they are, and (2) we had to allow for the sometimes sudden changes brought about by economic conditions. In 1983 for example, a significant drop in ocean freight rates made route A the most advantageous one, where previously, with freight rates of $30.00 per tonne, this route would have ranked no higher than third.

This is a good time to point out that here we were unable to allow for possible changes in the Crow rate and this will be a matter of some concern as we continue with comparative studies.

Be that as it may, there are two constants between the 1981 and the 1983 tables: options B_1 and B_2 (route B) are almost the same and have a distinct advantage over routes D and E. In these scenarios, the combination rail-laker-ocean vessel was clearly more economical than the rail-ocean vessel one.

Any escalation in the price of fuel increases the cost of rail transport to the advantage of water transport. The authors of the Acres and Data Resources report take this into account in their forecast of grain traffic through the Seaway.

Table 30

Comparison of Costs: Wheat from the West to Rotterdam by Five Optional Routes
(1983 cost levels, $/tonne, Canadian)

Route	**A**	**B**		**D**	**E**
Hypothesis		**B_1**	**B_2**		
Preparation of grain	*	*	*	$3.88	*
Prairies/Thunder Bay	$5.34	$5.34	$5.34	$5.34****	$5.34
Handling at Thunder Bay	$5.35	$5.35	$5.35	—	$6.58
Laker to port of departure	—	$16.90	$16.50**	—	—
Rail to port of departure	—	—	—	$20.92	$26.92
Handling at port of departure	$0.51***	$1.47	$1.47	$1.87	$1.87
Ocean vessel (with "top-off" on the St. Lawrence)	$24.10	—	—	—	—
Ocean vessel to Rotterdam	—	$10.93	$10.15	$10.93	$10.93
Total	**$35.30**	**$39.99**	**$38.81**	**$48.94**	**$51.64**

* Costs included in handling at Thunder Bay.

** Estimate.

*** Cost of topping-up spread over total tonnage carried.

**** Cost charged even if no stop made at Thunder Bay.

Sources: — Canadian Grain Commission (1982/1983), *Exports of Canadian Grain*, p. 27.
— Acres Consulting Services and Data Resources Inc. (1982) *Seaway Commodity Flow Forecast 1980 to 2000*, p. 3-136.
— Canadian Pacific and Canadian National.

Table 31

Forecast of Canadian Grain Shipments Through Seaway
(millions of tonnes)

	MLO	Welland	Maximal Total Volume
1985			
Export	11.9	11.9	11.9
Domestic consumption	1.4	1.9	1.9
	13.3	**13.8**	**13.8**
1990			
Export	14.4	14.4	14.4
Domestic consumption	1.4	1.9	1.9
	15.8	**16.3**	**16.3**
1995			
Export	17.0	17.0	17.0
Domestic consumption	1.4	2.0	2.0
	18.4	**19.0**	**19.0**
2000			
Export	19.4	19.2	19.4
Domestic consumption	1.4	2.0	2.0
	20.8	**21.2**	**21.4**

Source: Acres Consulting Services Limited and Data Resources Inc. (1982), *Seaway Commodity Flow Forecast 1980 to 2000*, p. 3-145.

As mentioned earlier, by adding the projected grain exports from the west and those from Ontario, as well as the projected grain consumption in eastern Canada, we can forecast the volume of grain that will be shipped through the principal sections of the Seaway between 1985 and the year 2000. In Table 31, we present the substance of the conclusions reached by the authors of the *Seaway Commodity Flow Forecast 1980 to 2000*, but we repeat our warnings regarding the Crow, and the At and East rates.

Now we turn to the question of American grain, using the same principal sources of information.

American Grain

It is estimated that American grain exports, which reached 111 million tonnes in 1980, could total 270 million tonnes in the year 2000. The U.S. is the world's leading exporter of grain.

It is no mistake to say that, despite high domestic consumption, the American grain trade is taking on considerable strategic importance which can be compared without hesitation to the strategic importance of the oil trade. Sales and donations of American grain are essential in maintaining the standard of living in a number of countries including, for instance, the Soviet Union and Egypt.

Table 32 serves as a starting point for consideration of the forecasts in question. It describes the situation between 1976 and 1980 based on the four export routes: (1) the Seaway (comprising four options), (2) the Atlantic coast, (3) the Gulf of Mexico and (4) the Pacific coast.

It has been apparent all along, as borne out in Table 32, that the Great Lakes-St. Lawrence route is in brisk competition with the Mississippi route. In 1980, the Mississippi route attracted 59 % of American corn exports, 49 % of wheat traffic and 79 % of soybean traffic.

Before we can present our forecasts, we must look at the markets to which the grain was sold and then study the comparative costs of the various routes. But first, a few comments on the growth of traffic are called for.

From 1965 to 1971, between 20 % and 25 % of American corn export traffic was moved through the Great Lakes-St. Lawrence route. In 1980, shipments dropped to 9 %, the loss being felt primarily in the western zone which is served by the ports of Duluth/Superior and Chicago/Milwaukee. The decline may have been due to an increase in unit trains to the south and to the setting in Illinois and Iowa of advantageous annual rail rates to ports on the Gulf of Mexico. During the same 1971 to 1980 period, transportation of corn by barge along the Illinois River and the upper Mississippi also increased rapidly, due again to lower costs.

Since 1979, the Pacific ports have also been carving out an important place in the export of American corn to Asia, and claimed 50 % of the traffic in 1980. The grain shipped from these ports comes mainly from Nebraska,

western Iowa and southwest Minnesota, a region in which competition between the Great Lakes, the Mississippi and the Pacific coast is very intense. For its part, the port of Toledo has also experienced competition from unit trains and annual volume rates for trains bound for the Gulf of Mexico or the Atlantic seaboard. But while Toledo has succeeded in holding on to its share of corn exports, the Atlantic coast has seen its share decline.

In the case of wheat, Duluth/Superior has increased its share slightly despite large annual fluctuations. The usual explanation for this is that the Great Lakes serve as a valve when other routes are overloaded. The authors of the *Seaway Commodity Flow Forecast 1980 to 2000* point out that because wheat is less suitable than corn for large-scale transportation by unit train, this mode of transport arrived late on the wheat market scene. There are in fact several types of wheat whose blends must be adjusted to importer requirements, making complex storage and mixing installations necessary. These operations are therefore more easily performed in the port of loading than in local elevators. In addition, since the wheat producing zones stretch to the west from the Dakotas and Montana to Kansas and Oklahoma — zones often far from the Mississippi system — the railways have not too much to fear in the way of competition from barge carriers. In the north, road transport competes with the railway to the Great Lakes and to the ports of the Columbia-Snake complex in the states of Oregon, Washington and Idaho. In fact, in order to better cope with competition from road transportation, the railways have, since 1981, been

Table 32

Exports of American Grain by Coastal Region
(thousands of tonnes)

	1976	1977	1978	1979	1980
CORN					
Chicago	1 541.7	1 232.6	1 907.9	3 021.2	1 837.4
Duluth	343.9	140.7	1 440.2	1 304.8	1 068.2
Toledo/Saginaw	2 065.3	2 253.9	2 645.6	2 796.4	3 072.2
U.S. Great Lakes	3 950.8	3 627.1	5 993.8	7 122.4	5 977.8
U.S. Atlantic	10 240.7	9 114.4	9 515.6	11 581.5	9 411.6
U.S. Gulf	29 800.5	27 036.1	31 292.7	34 423.7	36 997.0
U.S. Pacific	151.5	375.7	3 001.5	6 343.3	9 329.4
Total	**44 143.6**	**40 153.4**	**49 803.6**	**59 470.8**	**62 924.9**
WHEAT					
Chicago	68.9	43.3	390.9	8.8	0.0
Duluth	1 313.0	2 429.2	4 611.9	3 654.8	3 304.6
Toledo/Saginaw	181.1	498.3	570.3	439.0	387.3
U.S. Great Lakes	1 563.0	2 970.8	5 573.1	4 102.7	3 691.9
U.S. Atlantic	1 761.5	1 019.3	1 242.7	669.3	1 758.5
U.S. Gulf	13 409.4	12 887.9	17 061.1	17 470.1	17 404.3
U.S. Pacific	9 703.5	7 433.3	10 098.7	10 752.2	12 574.5
Total	**26 437.4**	**24 311.3**	**33 975.7**	**32 994.2**	**35 716.3**
SOY BEANS					
Chicago	402.6	386.9	551.8	511.6	124.1
Duluth	0.0	0.0	123.0	71.7	28.5
Toledo/Saginaw	1 235.9	1 320.1	1 859.6	1 102.1	1 496.3
U.S. Great Lakes	1 638.5	1 707.1	2 534.4	1 685.4	1 649.0
U.S. Atlantic	1 753.1	1 786.5	2 351.9	2 831.8	2 497.8
U.S. Gulf	11 904.1	12 649.9	16 102.0	16 127.9	17 368.3
U.S. Pacific	3.1	25.0	13.0	3.0	7.1
Total	**15 298.9**	**16 168.5**	**21 001.3**	**20 648.1**	**21 859.1**

Source: Acres Consulting Services Limited and Data Resources, Inc. (1982), *Seaway Commodity Flow Forecast 1980 to 2000*, pp. 3-162, 165-167.

offering unit trains and annual volume rates to the Pacific coast, the Gulf of Mexico and Duluth/Superior. Furthermore, if the railways of the northern plains (the Dakotas and Montana) see the Great Lakes as a useful outlet for export grain, it would be worthwhile examining the reasons for this.

Although, in the case of soybeans, total U.S. exports have more than tripled, increasing from 6.2 million tonnes in 1965 to 21.9 million tonnes in 1980, the volume shipped by the Great Lakes and the St. Lawrence has decreased significantly, from 26 % to 8 %. This decline may be attributed to inadequate installations on the Great Lakes for the handling of soybeans. The Mississippi system, which is better equipped, has therefore claimed the additional volumes not only of soybeans but also of oil and oil cakes which come from crushing plants in Minnesota, Iowa and Illinois.

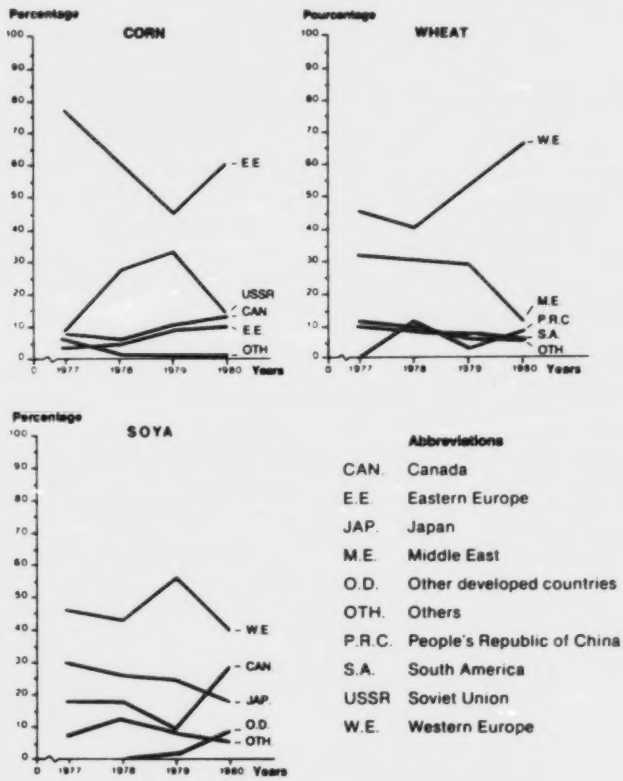
We now turn our attention to the importing countries since they certainly influence the choice of route, usually favouring the most economical one. Table 33 gives the volumes of American export grain shipped through the St. Lawrence and the Great Lakes between 1977 and 1980 to various importing countries.

It appears that more than 85 % of the corn was bound for Europe and the USSR. Nevertheless, there was a gradual decrease in direct transport by small ocean vessels in favour of transshipment in the ports of the St. Lawrence. The reason for this may have been the decline in upbound steel and coke cargoes. The decrease in the Great Lakes share of corn traffic is attributed less to a lack of competitiveness than to a perhaps temporary change in overseas customers. We see that exports of American corn to the USSR dropped suddenly from 13.9 million tonnes in 1970 to 5 million tonnes in 1980, while those to Japan and South America increased. It must be remembered that the U.S. placed an embargo in 1980 on grain shipments to the USSR.

In the case of wheat, between 70 % and 80 % of American exports through the Seaway were bound for Western Europe or the Middle East. From 6 % to 8 % of the tonnages were shipped to South America and from 3 % to 11 % to China. The USSR, strangely enough, used the St. Lawrence and Great Lakes system for its corn imports but very little for its wheat imports. Be that as it may, in the case of wheat and corn, small ocean vessels are losing

Table 33

Foreign Market Shares of U.S. Seaway Grain Traffic



Source: Acres Consulting Services Limited, Data Resources Inc. (1982), *Seaway Commodity Flow Forecast 1980 to 2000*, pp. 3-170, 3-174, 3-178.

ground to lakers which tranship on the St. Lawrence. On the whole, only the western European share of the market remains firm, with other countries turning more and more to other routes.

Finally, the Canadian soybean market has varied considerably, between 9 % and 28 %. During the same 1977 to 1980 period, Western Europe and Japan accounted for between 67 % and 80 % of the soybean traffic. The decline in Japanese imports could be linked to the decline in Japanese steel deliveries in the Great Lakes in 1979 and 1980, since soybeans were shipped as backhaul cargo in the small ocean vessels which delivered Japanese commodities in the Great Lakes ports. Overall, it seems that soybean traffic will be in danger if exporters, importers and carriers fail to take concerted action to remedy the situation.

Obviously, the tables we have studied cannot take account of the fact that grain for other destinations is often stored in certain large ports in Western Europe. But lack of information on the final destination of grain passing in transit through the St. Lawrence does not for the moment interfere with the task of establishing forecasts. To arrive at these forecasts, we must first, as in the case of Canadian wheat, conduct a brief comparative study of transportation costs for American grain exports. Here again, we will follow the authors of the *Seaway Commodity Flow Forecast 1980 to 2000*.

The comparative analysis of costs will once again be complex but is nevertheless indispensable in establishing judicious forecasts.

The two routes from the production zones to Rotterdam by way of the Great Lakes and the St. Lawrence pass through Duluth and Toledo. These two routes are in competition with at least one other route and to a large extent with modes other than water transport.

For example, the Minnesota-Rotterdam journey starts by rail or truck, after which the grain is loaded on to a laker or an ocean vessel to be shipped through the Great Lakes and the St. Lawrence. One alternative to this is to ship the grain by rail or truck to Minneapolis and from there by barge to New Orleans where it links up directly with an ocean vessel. A further alternative is to ship the grain by rail from the production zones to New Orleans and thus direct to an ocean vessel.

As for the Toledo-Rotterdam route, grain received at Toledo can also be loaded onto a laker or an ocean vessel and shipped by the Great Lakes and the St. Lawrence. But it can also be moved by rail to an Atlantic port such as Baltimore, where it can be loaded onto an ocean-going vessel.

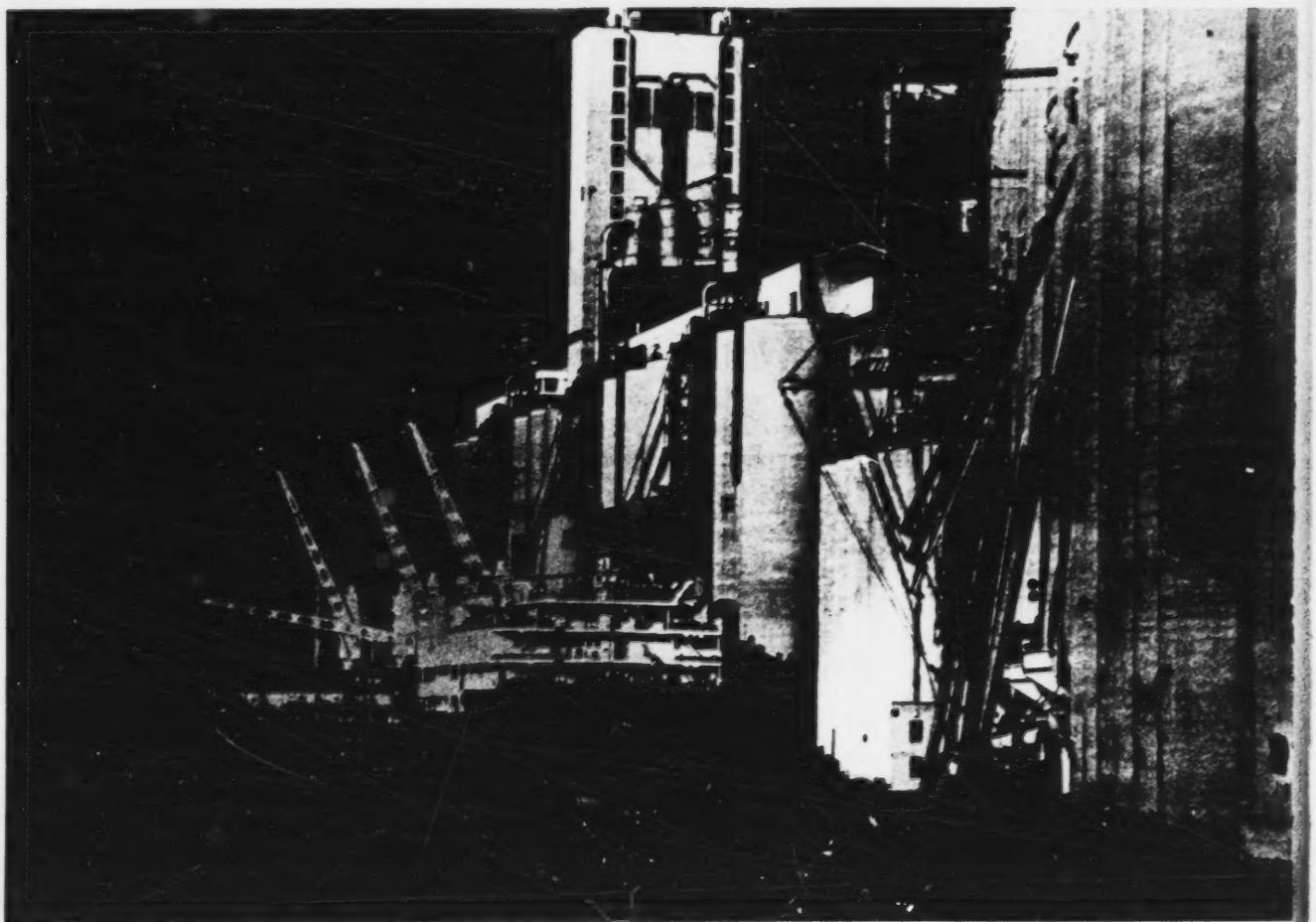


Photo: John Hutchinson

Grain from Toledo can be loaded onto lakers or ocean vessels for the journey down the Great Lakes and the St. Lawrence, and on to Rotterdam.

We must therefore look at three comparisons:

(1) Duluth-Rotterdam by Port-Cartier compared with Duluth-Rotterdam by the Mississippi;

(2) Toledo-Rotterdam by the Great Lakes and the St. Lawrence compared with Toledo-Rotterdam by an Atlantic port such as Baltimore;

(3) Minnesota-Rotterdam by rail to the Gulf of Mexico compared with Minnesota-Rotterdam by rail or road to Duluth, then by laker and ocean vessel.

In comparing the three tables, we must take into account the appropriate differences since the comparisons have to do with the variable costs of the routes compared in each table.

The first comparison (Duluth-Rotterdam by Port-Cartier or the Mississippi) for 1981 appears in Table 34.

The second comparison (Toledo-Rotterdam by the St. Lawrence or by Baltimore), also for 1981, appears in Table 35.

The third comparison (Minnesota-Rotterdam by the Gulf of Mexico or the St. Lawrence, or again by rail or Seaway) appears in Table 36.

Tables 34, 35 and 36 are used primarily to pinpoint trends that must be considered in establishing forecasts. These same tables also identify general elements which are equally useful in analysing the situation. Following are a few comments of a general nature.

The St. Lawrence route has, a priori, an unquestionable advantage in that it can be used by heavy tonnage ocean vessels. No port on the east coast or on the Gulf of Mexico can accommodate ships of 100 000 tonnes as can the St. Lawrence. But in practice, this advantage depends on the degree of supply and demand for such ships and is in turn limited by the capability of foreign ports to accommodate heavy tonnage ships.

A large volume of grain is moved from Canadian or American ports in ships that have a shallower draught than these ports can handle. Shallow-draught ships ranging from 25 000 to 50 000 tonnes are common. Therefore, it would seem that even ships of 60 000 tonnes would be a major advantage to the St. Lawrence route, an advantage that can be quantified at about $6.00 per tonne. It should not however be forgotten that the availability of ships is such that owners are sometimes compelled to move cargoes for the price of the fuel alone, as has recently happened. The Seaway route would even be competitive if U.S. western grain was trucked an additional 240 km to the Great Lakes ports.

As the first comparison shows, the shipping of iron ore is tied in with the advantages of the Seaway, since backhaul cargoes can reduce prices by 25 %, or from $16.00 to $12.00 per tonne in the case cited.

In the case of the second comparison (Toledo-Rotterdam), the St. Lawrence route once again proves to be advantageous a priori. It is the most economical route and this advantage could be enhanced by having the grain for Toledo picked up by truck within a radius of between 300 and 500 km (according to the range allowed by the trucking rates). The question therefore is why, all year long, grain from regions located only 160 km from Toledo is shipped to the east coast.

The answer to this question may be that elevators are available in the railway centres. These elevators and centres make it easier to load unit trains, and because the grain comes to them direct from the farm, they do away with the need for costly handling, and account for a saving of between $5.28 and $5.88 (Canadian) per tonne. These figures may be even higher if, as we believe, the rates quoted by the railways are in fact lower than the "normal" rates used by the authors to whom we refer.

But it cannot be forgotten in this, as in other cases, that the Great Lakes-St. Lawrence system does not seem to be widely known, to say the least. On this subject, the president of the American Steamship Company, D. Ward Fuller, noted:

> ... The transportation department (of a large U.S. company) came back to (one of its senior executives) and told him that Lake Erie was so shallow that only barges could operate on (it)![1]

1 This quotation is taken from the hundred or so briefs received during the St. Lawrence Task Force consultations. In this report, we refer, where necessary, to briefs, letters or interview notes.

This comment is all the more significant because it refers to a company active in bulk shipping by rail in the Great Lakes area. More must be done to spread the word about the advantages of the Seaway and to radically change certain impressions that prevail and are even fostered in some circles.

The third comparison is an important one, since direct shipments by rail from southwestern Minnesota to the Gulf of Mexico are taking the lead at the expense of the Mississippi and the Seaway. This happens when producers can deliver their grain direct to rail terminal elevators, thereby saving between $1.50 and $2.50 US per tonne, which is almost sufficient to pose a serious threat to water routes. This situation may have an even greater effect on the use of the Great Lakes and St. Lawrence route, since the Gulf of Mexico would be an advantageous route for exports to Africa, Latin America or the Middle East.

One of the factors affected by economic conditions is of course the cost of fuel, and the first victim of any increase in fuel prices is the trucking industry, followed by the railways and to a lesser degree barges, lakers and ocean vessels.

Before concluding, it should be mentioned that the rate structure for waterways is an important element in cost competitiveness. Now, at the onset of changes in this field, we must show vigilance and carefully analyse all suggestions or proposals.

Table 34

Grain Logistics Cost Comparison (Minnesota to Rotterdam) Seaway Versus River Routing, 1981[1] (in $US per tonne)

Via Port-Cartier	**Costs**
Lake vessel (Duluth-Port-Cartier)	$12.10 to $16.30[2]
Ocean vessel (Port-Cartier-Rotterdam)	
100 000 dwt	$10.95
60 000 dwt	$12.48
Total: 100 000 dwt	**$23.05 to $27.25**
60 000 dwt	**$24.58 to $28.78**
Via the Mississippi	
Barge (Minneapolis-New Orleans)	$15.58
Ocean vessel (New Orleans-Rotterdam)	
60 000 dwt	$18.89
Total:	**$34.87**

1 The table does not take into account transhipment or handling costs which are the same on both routes.

2 Depending on the availability of backhaul cargoes (iron ore from Sept-Îles to Ashtabula).

Source: Acres Consulting Services and Data Resources Inc. (1982), *Seaway Commodity Flow Forecast 1980 to 2000*, p. 3-182.

Table 35

Grain Logistics Cost Comparison (Toledo to Rotterdam) Seaway Versus Atlantic Coast Routing, 1981 (in $ per tonne)

Seaway (by Toledo and Port-Cartier)	**$US**	**$CAN**
Lakes fobbing	*[4]	*
Lakes transportation	9.75	11.70
Ocean fobbing	*	*
Ocean transportation		
100 000 dwt	9.12	10.95
60 000 dwt	10.40	12.95
Total		
100 000 dwt	**18.87**	**22.65**
60 000 dwt	**20.15**	**24.18**
Baltimore		
Rail fobbing	*	*
Rail costs		
Unit train[1]	18.00	21.60
Form A[2]	12.60	15.12
Actual rate	12.99	15.60
Ocean fobbing	*	*
Ocean transportation (60 000 tonnes)	12.79	15.35
Total		
Unit train[1]	**30.79**	**36.95**
Form A[2]	**25.39**	**30.47**
Actual rate[3]	**25.78**	**30.95**

1 DRI/Kearney Unit Train Model.

2 DRI/Kearney Rail Costing Model.

3 Norfolk and Western Railroad.

4 Same cost for both routes.

Source: Acres Consulting Services Limited and Data Resources (1982), *Seaway Commodity Flow Forecast 1980 to 2000*, p. 3-196.

On this subject, the St. Lawrence Task Force received unequivocal testimony from Donald S. Rothwell, president of the Great Lakes Waterways Development Association, who said:

> "Plagued with overcapacity, barge rates on the Mississippi are very low, attracting thousands of tonnes of export grain that would normally leave the United States by the lake ports of Duluth or Toledo."

In a general way, it seems that the export of American grain through the St. Lawrence Seaway is tied to factors not easily controlled by the Canadian side. The advantages of a natural route to Rotterdam and the Baltic can be diminished by measures beyond Canadian control. Even if Canadian costs were further reduced, American competition would still hold some economic trumps. The deregulated railways can quote attractive prices for long-haul transport by unit trains over long periods of time; and this does not take into account the advantage of railway loading points in the midst of production zones which reduce handling, hence costs.

There are many American promoters of Great Lakes ports. But will they be able to ensure a proper balance between the costs of different types of transport: a balance related to real costs? Will potential user costs be fairly divided among transport modes, or routes? This is a matter of very legitimate concern.

Table 36

Comparative Costs — Rail-to-Gulf Versus Seaway Routing[1]
(in $US per tonne)

Gulf	
Rail to Gulf	23.50[2]
Ocean fobbing	*[3]
Ocean vessel to Rotterdam	15.70
Total	**39.20**
Seaway	
Rail to Duluth	12.00 +
Lakes transfer	1.50 – 2.00
Lakes cost	10.00 – 13.50
Ocean fobbing	*
Ocean vessel to Rotterdam	9.00 – 10.40
Total	**32.60 – 38.40**

1 The figures in this table are somewhat different from those in Table 34. The Acres and Data Resources authors give no explanation for this. They probably chose not to give the tonnage of the ocean vessels this time.

2 Chicago Northwestern Railway.

3 Same costs for both routes.

Source: Acres Consulting Services Limited and Data Resources Inc. (1982), *Seaway Commodity Flow Forecast 1980 to 2000*, p. 3-188.

Photo: Port de Québec

Unlike the ports of the eastern seabord and the Gulf of Mexico, those of the St. Lawrence can receive heavy ocean vessels. The port of Sept-Îles can accommodate the largest carriers afloat (260 000 tonnes), the port of Québec carriers of 150 000 tonnes and the port of Montréal carriers of 80 000 tonnes.

Here we see a 135 000-tonne ship at Québec.

Let us now turn to the forecasts in Table 37 on the Canadian Seaway, as they emerge from an analysis of measurable or significant trends of the American grain export market.

They are encouraging forecasts, though the economic effects for Canada and Québec would not be the same as those of the strictly Canadian trade. And we can now consider the forecasts in the *Seaway Commodity Flow Forecast 1980 to 2000* which deals with the total volume of grain (American and Canadian) projected for the St. Lawrence Seaway and the Great Lakes.

Table 38 shows total traffic projections in the two segments of the Seaway by origin and by five-year period.

If analyses of forecasts were carried further, we would have to examine the growing attraction of Pacific ports (Washington and Oregon) and the part they play in movement of grain to the Pacific Rim.

We have compared these forecasts with those of other documents already mentioned, especially the Misener report[1] and the Michigan study.[2]

The Misener report is very optimistic since it projects a total of 40 to 45 million tonnes for 1985, while forecasts in the preceding table show a total volume of 29.6 million tonnes for 1985. The Michigan report, which it must be remembered refers only to American grain, projects 14.89 million tonnes for 1985 and 20.08 million tonnes in 1990, compared to 15.8 million tonnes in 1985 and 17.8 million tonnes in 1990, in Table 38.

However, we will continue to use material from the *Seaway Commodity Flow Forecast 1980 to 2000* of the Acres Consulting Limited and Data Resources Inc. (1982), as under the circumstances, the analyses and supporting evidence strike us as better and more detailed. In making this choice, we realize that recent economic difficulties have certainly scaled down a number of forecasts for current years. This only underscores the necessity to follow trends very closely.

The Michigan study raises an interesting point that deserves comment. This is the rapid growth in exports of sunflower seeds from the Great Lakes ports since 1974. Tonnages should go up from 1.6 million tonnes in 1982 to 2.3 million tonnes in 1990. The weight factor here is as important as volume, for one of the consequences of the light weight of sunflower seeds is that fully loaded (by volume) ocean-going vessels can pass through the Seaway locks without any difficulty. And will a rapid

Table 37

Seaway U.S. Traffic Projection — Total All Grains
(thousands of tonnes)

	MLO	Welland	Maximum Total Volume
1980	12 327	13 286	13 286
1985	15 000	15 800	15 800
1990	17 000	17 800	17 800
1995	19 400	20 300	20 300
2000	22 700	23 500	23 500

Source: Acres Consulting Services Limited and Data Resources Inc., (1982), *Seaway Commodity Flow Forecast 1980 to 2000*, p. 3-206.

Table 38

Total Seaway Grain Traffic
(millions of tonnes)

	MLO	Welland	Maximum Total Volume
Canada			
1978-1980	12.5	13.0	13.3
1985	13.3	13.8	13.8
1990	15.8	16.3	16.3
1995	18.4	19.0	19.0
2000	20.8	21.2	21.4
United States			
1978-1980	13.8	14.5	14.5
1985	15.0	15.8	15.8
1990	17.0	17.8	17.8
1995	19.4	20.3	20.3
2000	22.7	23.5	23.5
Total			
1978-1980	26.3	27.5	27.8
1985	28.3	29.6	29.6
1990	32.8	34.1	34.1
1995	37.8	39.3	39.3
2000	43.5	44.7	44.9

Source: Acres Consulting Services Limited and Data Resources Inc., (1982), *Seaway Commodity Flow Forecast 1980 to 2000*, pp. 3-216 and 3-218.

1 Great Lakes/Seaway Task Force (1981), *The Great Lakes/St. Lawrence Seaway: Setting a Course for the '80s*, Toronto, Government of Ontario.

2 Thompson, S.R. and R.L. Johnson (1982), *Grain Transportation on the Great Lakes/St. Lawrence Seaway*, Ann Arbor, Michigan State University, Michigan Sea Grant, Extension Bulletin E-1482.

increase in sunflower tonnage not automatically bring about a corresponding growth in (transhipment) traffic in St. Lawrence ports?

Grain traffic calls for detailed analysis because it accounts for the greatest volume of exports on the St. Lawrence. We wish to bring out the variety and complexity of factors that must be kept in mind in analysing this maritime transport and trade, and for this we are particularly indebted to the *Seaway Commodity Flow Forecast 1980 to 2000* study.

On the whole it seems that the Mississippi will indirectly affect the development of export volume on the St. Lawrence, because of the importance of American exports and the role the Mississippi has in them. As far as Canadian grain is concerned, because of major investments in the railway network to the east, the port installations in Thunder Bay and the fleet of lakers, the Canadian Wheat Board is unlikely to neglect them, or to impose any restrictions on competition.

If Soviet agriculture should experience the success that has been counted on for so long, it is obvious this will affect the grain market to the east. On the other hand, new customers for the St. Lawrence are appearing in Africa, the Middle East and the Mediterranean; the most striking growth in demand is in Asia. Was not the doubling of the railway tracks across the Rockies made to facilitate supplying Asian markets? This suggests that there might not be any spectacular growth in St. Lawrence shipping, but it is no more likely that there will be any decrease.

The one place the St. Lawrence has not been able to hold its share of the market has been in the shipment of soybeans. There has been a lack of coordination in the major commercial corporate networks, but no doubt it is not too late to overcome this shortcoming. Wheat is encountering stiff American competition, particularly via the Mississippi. Nevertheless, there are major assets that can outweigh the risks. The risks have been reduced by the existence of modern grain elevators along the St. Lawrence, which are either owned or administered by large companies: Cargill, Bunge, Louis Dreyfus.

Seaway customers today have to pay very substantial user fees. At least they seem high and unfavourable when it is realized there are none applied to the one hundred and twenty-nine locks on the Mississippi and its tributaries. They are a major disadvantage as far as competition is concerned.

The decline in the demand for Québec iron ore in the Great Lakes region has reduced the return loads of ships carrying grain on the Great Lakes and the St. Lawrence. Water transport rates for grain have been increased accordingly. It is to be hoped that this situation is temporary; it has to be followed closely, so that if need be corrective action can be taken.

When one considers the many advantages of the St. Lawrence, such as its draught and relative proximity to the European continent and the Mediterranean, it seems logical that everything should be done to convert these geographical and physical advantages into definite economic advantages. If the Québec/Rotterdam route is compared with the New Orleans /Rotterdam route, or if the Québec/Alexandria route is compared with that from New Orleans, it is immediately clear that the route from Québec is by far the shorter:

Translatlantic Maritime Distances
(in km)

	Rotterdam	Alexandria
Québec	5 560	8 968
New Orleans	8 964	11 801

Source: Canadian Ports and Seaway Directory (1982).

This is a considerable asset that should be better known and taken into account in the general economy of maritime transport.

To achieve this, there must be constant examination of the major segments of economic data and their components; this is the only way different strategies and measures can be made truly effective and beneficial. Our purpose is to bring these to the attention of the parties involved, particularly the authorities in Québec. We will continue with an examination of St. Lawrence maritime traffic, and in particular that of iron ore, which was and continues to be very important in the economics of transport on the Great Lakes and the St. Lawrence.

Iron Ore

Québec-Labrador, as is well known, is very rich in iron ore, and what is involved here is not transhipment as with grain, but shipments directly from Québec. Québec-Labrador is the only North American region that can ship iron ore outside North America; the reserves in Minnesota are used entirely in the Great Lakes region, where there is a large concentration of important steel mills.

Table 39

Distribution of Iron Ore Shipments from Québec-Labrador, 1973-1981
(millions of tonnes)

	Total	Canada	United States (Great Lakes)	United States (East Coast)	Overseas
1973	35.1	3.2	11.5	5.3	15.0
1974	34.9	3.4	10.0	5.2	16.4
1975	34.3	3.1	10.1	5.5	15.6
1976	44.7	3.1	15.4	6.2	20.0
1977	44.0	4.1	16.8	5.3	17.8
1978	33.4	3.2	10.5	6.3	13.2
1979	52.4	5.5	11.0	9.9	26.0
1980	43.2	5.8	7.3	9.1	21.2
1981	43.5	4.9	9.8	8.6	21.4

Source: Dufresne, C. (1982), *Expédition de minerai de fer du Québec-Labrador par la Voie maritime*, Report of the Colloque sur le Système Grands Lacs-Saint-Laurent, Québec, June 7-9, 1982.

From 1973 to 1981, iron ore from Québec-Labrador was shipped, as shown in Table 39, to steel mills in Ontario (Canada), to American mills on the Great Lakes or the east coast, or to overseas regions.

It is also well known that our iron ore industry is in serious trouble. Mining and shipment of iron ore, after being the driving force behind the economic activities of several cities on the Côte-Nord and in Nouveau-Québec (Sept-Îles, Port-Cartier, Schefferville, Fermont, Gagnon and Havre-Saint-Pierre) have been levelling off and even declining. The recent closing of industries has even resulted in the shutdown of two municipalities, leading to the costly emigration of their inhabitants. What can be said about the future of iron ore shipments and their place in the maritime economy?

If we are to make forecasts or plans for the future, we have to understand the deep underlying reasons for the problems of the industry, and not just refer to Québec-Labrador's proverbial wealth in this respect. Iron ore has been — and still is — our major export. We have seen how transporting it by water has had a direct bearing on our grain economy. But what is the situation today, and what will it be tomorrow, considering the problems of the iron ore industry?

In the first place, we must recognize that by its nature an export market is closely linked to the world marked, and the iron ore market is one over which we have little influence. We will have a better understanding of the problem if we refer to a study commissioned by the Québec government for the ministère de l'Énergie et des Ressources.[1] We will not go into detailed analysis, but mention some of the main points as they bear on our subject.

The world demand for iron ore continues to grow, but is shifting geographically. More and more basic industries are being set up in developing countries, which has been confirmed by Reich,[2] Lawrence and Dyer,[3] and Naisbitt.[4]

Some countries such as South Korea and Taiwan have no iron ore supplies, and situated in the Pacific, they will tend increasingly to get material from countries in the region: Australia, India, Indonesia. Other countries such as Brazil and those in West Africa will process their own ores.

The United States, the European Economic Community (EEC) and Japan will continue to produce steel, particularly specialized steel, and they will have to import ore; but the number of supplier countries eager to enter these markets is constantly growing.

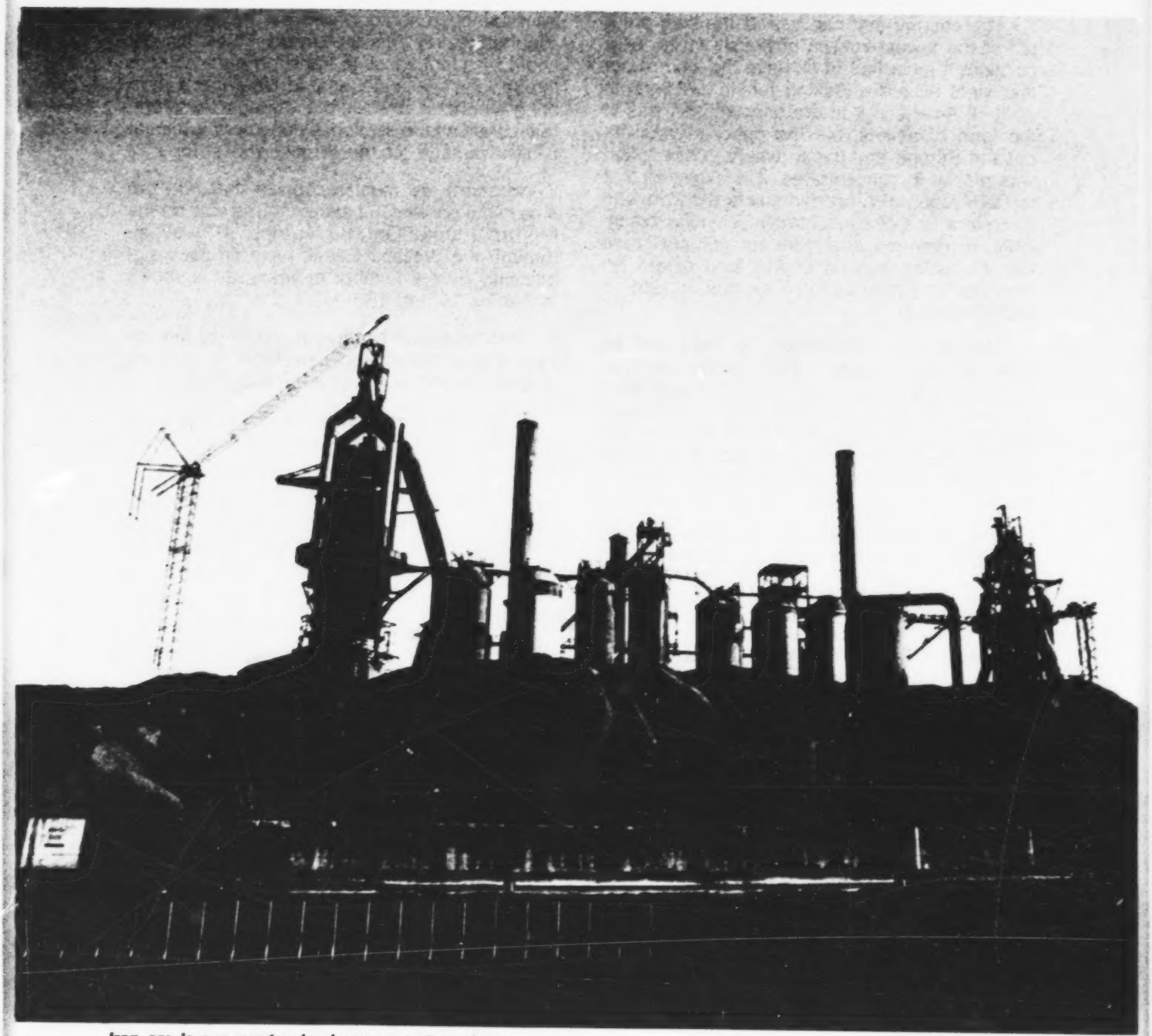
1 FARAH, S.E. (1983), *Minerais de fer au Québec-Labrador. Problématique et recommandations*, Service de l'économie nimérale, ministère de l'Énergie et des Ressources, 170 pp. and appendices.

2 REICH, R. (1983), *The Next American Frontier*, New York, NY Times Books, 324 pp.

3 LAWRENCE, P.R. and Dyer, D. (1983), *Renewing American Industry*, New York, Free Press, 384 pp.

4 NAISBITT, J. (1984), *Megatrends*, New York, Warner, 333 pp.

Photo: John Hutchinson



Iron ore is our most voluminous export product.

The country that can deliver the best product at the lowest cost is obviously in the best position. It must first of all have the kind of ore that steel mills are looking for. In 1981 about 90 % of American iron ore consumption was in the form of pellets, but the opposite was the case in Europe and Japan where consumption was mainly in concentrates. It is expected that modernization of American plants will also lead to greater use of concentrates. There is practically no demand any more for primary crude ore. Canadian exports of this kind of ore fell from 69 % of total iron ore exports in 1955 to 5.6 % in 1981.

Pellets and concentrates in 1981 had an average iron content of 60 % worldwide. The richer the ore is, naturally the easier and more economical it is to reach this level. But Québec ore has an average content of 30 %, while that of Brazil varies between 55 % and 66 %, which eliminates the necessity of making concentrates.

Furthermore, the kind of ore affects technology and preparation costs. Schefferville ore contains goethite and limonite, which makes pelleting more difficult.

Given these circumstances, Québec-Labrador ore is really competitive only in the domestic North American market, that is, in Québec, Ontario, in the Great Lakes states and on the Atlantic coast (Baltimore). Since the steel mills of those regions own our mines, it is only natural that they should take ore from these mines. A. Stanley West underscored this point in a recent lecture.[1] But the North American steel industry still remains in a very precarious position. The authors already quoted (Reich, Naisbitt, Lawrence and Dyer) maintain that it can never return to its previous production level. The trend is toward consolidation, modernization, production of specialized steels, and direct reduction pocket mills. It seems unlikely that shipments of Québec-Labrador ore will return soon to the level of ten years ago.

There is another important factor that should be analysed. The Ontario steel mills that own interests in our mines have also had interests in the Mesabi Range mines in Minnesota since 1974. In 1981 they used 4.3 million tonnes of Canadian ore, of which 2.4 million came from Québec-Labrador, and 6.4 million tonnes imported mainly from the United States. It costs about $1 a tonne less to transport American ore through the Welland Canal to Hamilton than to bring Québec-Labrador ore through the Montréal-Lake Ontario section. Québec ore is thus at a disadvantage for the Hamilton steel mills.

In short, we must recognize that iron ore shipments on the St. Lawrence Seaway, on the Montréal-Lake Ontario stretch as well as through the Welland Canal, have dropped significantly over a number of years, as is shown in Tables 15 and 16.

It is important to have a picture of the upbound and downbound movement of iron ore shipments on the St. Lawrence Seaway.

Table 40 gives the situation in 1981, as described in the *Seaway Commodity Flow Forecast 1980 to 2000*.

In 1982 there was a dramatic change in the situation. Total shipments of Québec-Labrador iron ore dropped to 28.8 million tonnes from 43.5 million tonnes in 1981.

Canadian traffic consists mainly of shipments between north shore ports and the western end of Lake Ontario (Hamilton) that is, upstream, as shown in Table 41.

International movement of iron ore in 1982 was evenly divided between upbound and downbound traffic, as shown in Table 42.

It should be noted that Tables 41 and 42 do not give a full picture of the entire iron ore traffic on the St. Lawrence-Great Lakes system. At least two elements are missing: exports from Havre-Saint-Pierre (iron ore and titanium) and American national traffic.

Total shipments dropped again in 1983. They totalled only 28.1 million tonnes, and about half of that production had to be sold on the free world market where there is strong competition from Brazil and West Africa. We should mention again that market demand is greater for concentrates than for the pellets that are normally produced here.

Given these circumstances, what does the future hold?

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1 WEST, A.S. (1984), *North American Iron Ore Today*, Proceedings of the Seminar on Transportation Policies and Demand for Coal, Iron and Steel, Louisville, Kentucky, Feb. 26-28.

Under present conditions, the forecasts made by the Acres Consulting Services and Data Resources seem to be fully shared by most experts. Shipments of Québec-Labrador iron ore upstream (Lake Ontario and Lake Erie) should stabilize around 15 to 17 million tonnes by the year 2000, of which 11 to 12 million will go to American steel mills and 4 to 5 million to Canadian mills.

From now on Québec producers should turn more and more to world markets, where large fluctuations can be anticipated.

One of the probable consequences that can be expected will be a growing spread, possibly a major one, between grain downbound and iron ore upbound. More than 50 % of the lakers could return empty. It is not hard to see what this will do to the grain trade.

Speaking of Québec's iron ore crisis, Jean Claude Lasserre, the author of an important work entitled *Le Saint-Laurent, grande porte de l'Amérique*, said in a recent article:

> Thus, the crisis has the unsuspected effect of making the St. Lawrence Seaway lose one of its economic advantages. Freight going in both directions promoted growth of a modern fleet of Canadian ships specializing in bulk shipments... Will the St. Lawrence Seaway lose this advantage because of the (steel) crisis?[1]

This is a very serious warning. Above all, it admonishes us to watch the market closely, to take appropriate corrective measures if called for, and not to neglect a crisis of these dimensions.

In conclusion, the Québec iron ore market has suffered a severe shock over the past few years, which could affect St. Lawrence Seaway traffic on a number of fronts: iron ore traffic (for the most part, this has already happened) and the vital grain traffic, if this is not closely watched. Shipments of iron ore to the Great Lakes have already declined sharply. Exports overseas and to the American east coast do not yet compensate for them.

The Great Lakes steel mills are a market for inexpensive ore. The demand could grow, and the mills could look for supplies elsewhere than in Québec-Labrador. The Great Lakes fleet cannot really be converted; most of the ships are not suitable for the high seas to pick up cargoes that cannot be found here. So there are grounds for looking for a new market in transhipping African or Brazilian ore on the St. Lawrence. There is already talk of shipping West African ore to the port of Québec, for an ultimate destination on the Great Lakes. By the time this report is published, that may already have taken place.

But our purpose is not to try to find lasting or definitive solutions. It is to describe certain problems, and their interrelations, and to set up or expand agencies that can produce valid solutions.

For reasons not related to St. Lawrence Seaway transport, its traffic has had a severe setback. Iron ore traffic has suffered an obvious and substantial drop. Apart from the first effect of this crisis, it could have far-reaching disruptive consequences on the balance between upbound and downbound traffic. For one thing, the availability of backhaul loads that are so important for grain shipments on the Seaway could be profoundly affected. This fact, and the tonnage figures, point up the importance of iron ore traffic on the St. Lawrence.

We will now turn to coal and oil.

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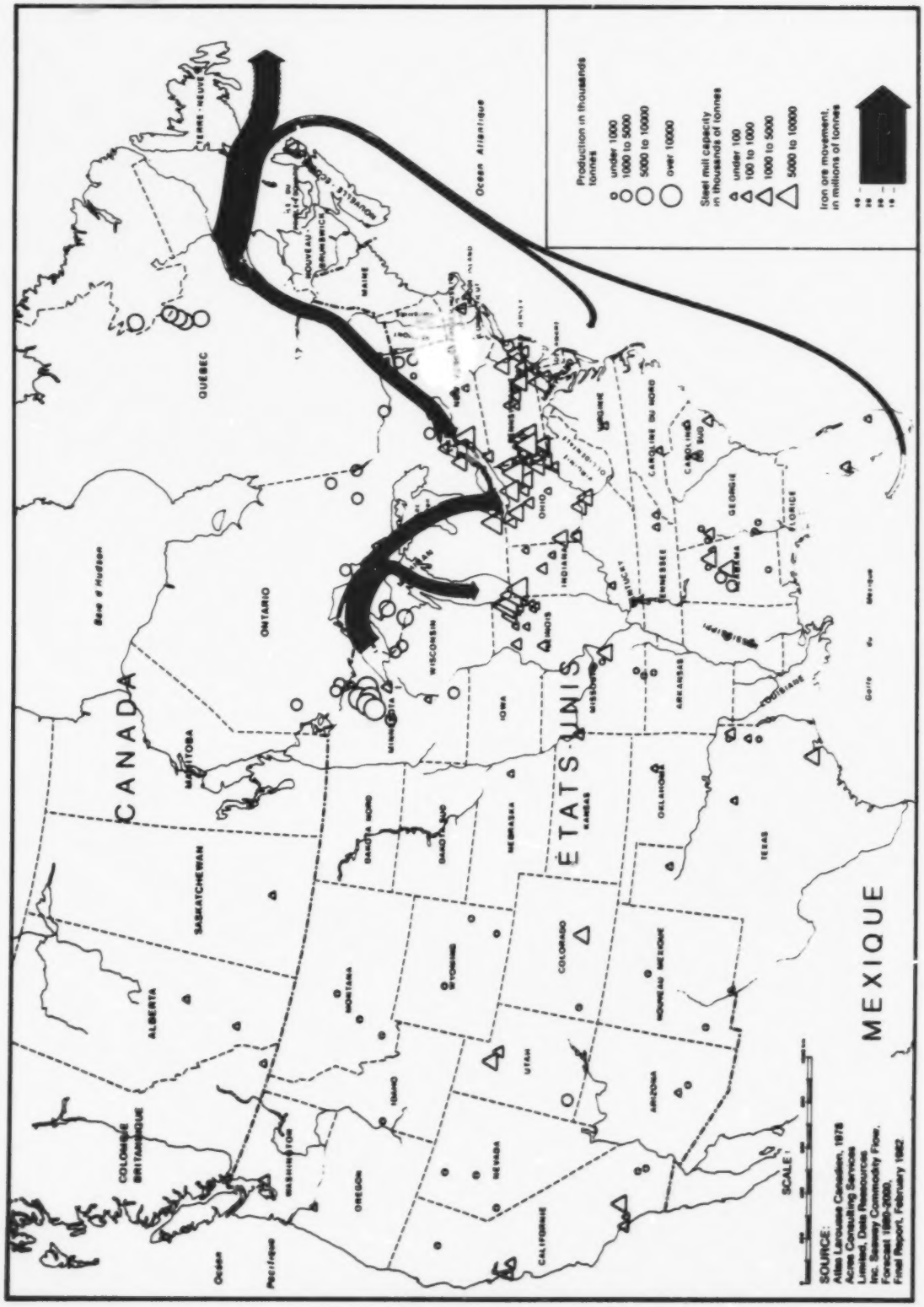
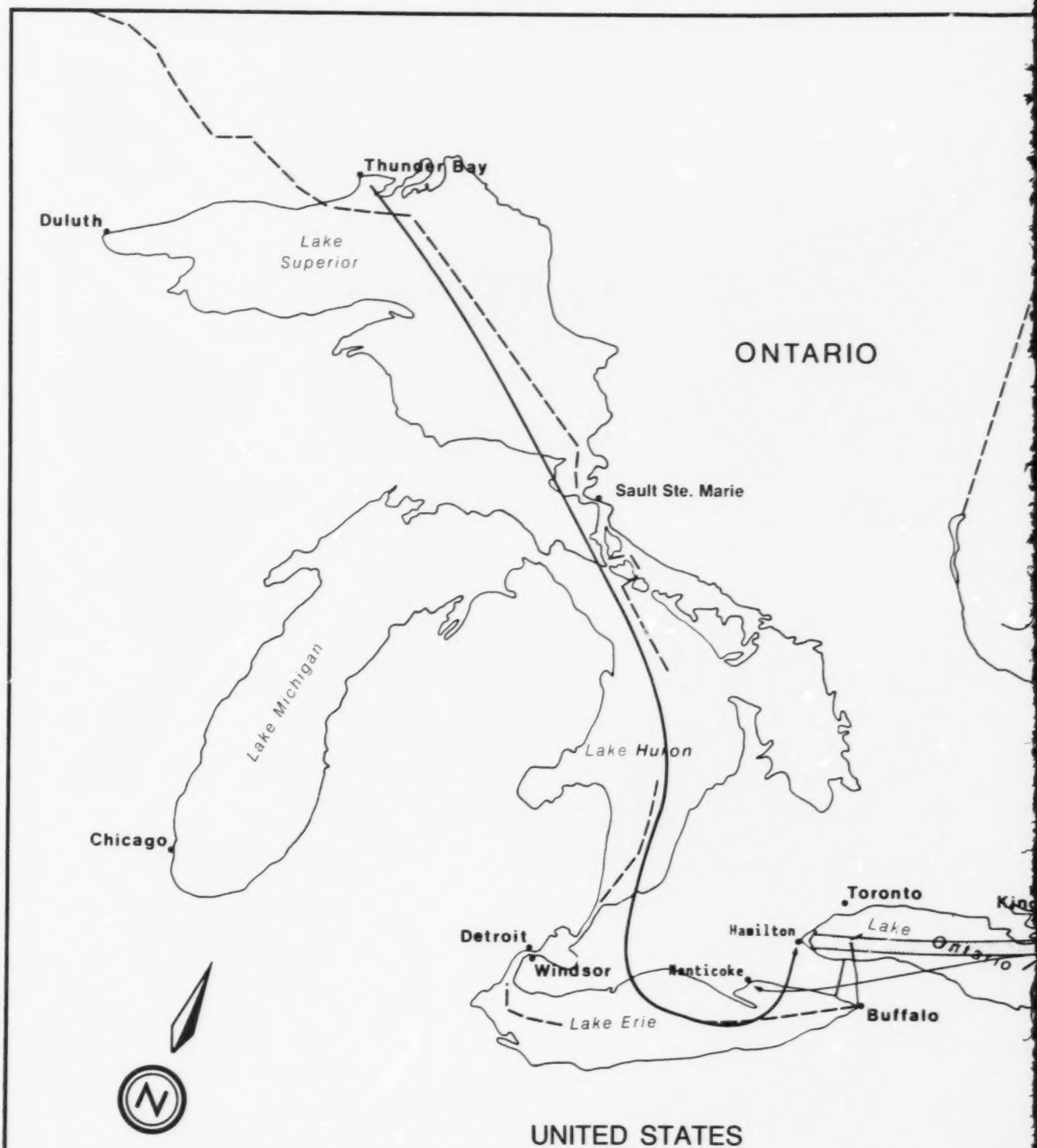
1 LASSERRE, Jean Claude (1983), "La Voie maritime du Saint-Laurent face à la crise: pour un essai de bilan". In *Les annales de géographie*. 92 (509) p. 38. Jean-Claude Lasserre is the author of *Le Saint-Laurent, grande porte de l'Amérique*. (Cahiers du Québec, collection Géographie), Hurtubise, HMH, 1980, 755 pp.

Table 40

Production Zones, Steel Mills and Iron Ore Movements, 1981





SOURCE: Data from Statistics Canada, Table II

Table 41

The St. Lawrence/Great Lakes System
National Iron Ore Traffic, 1982

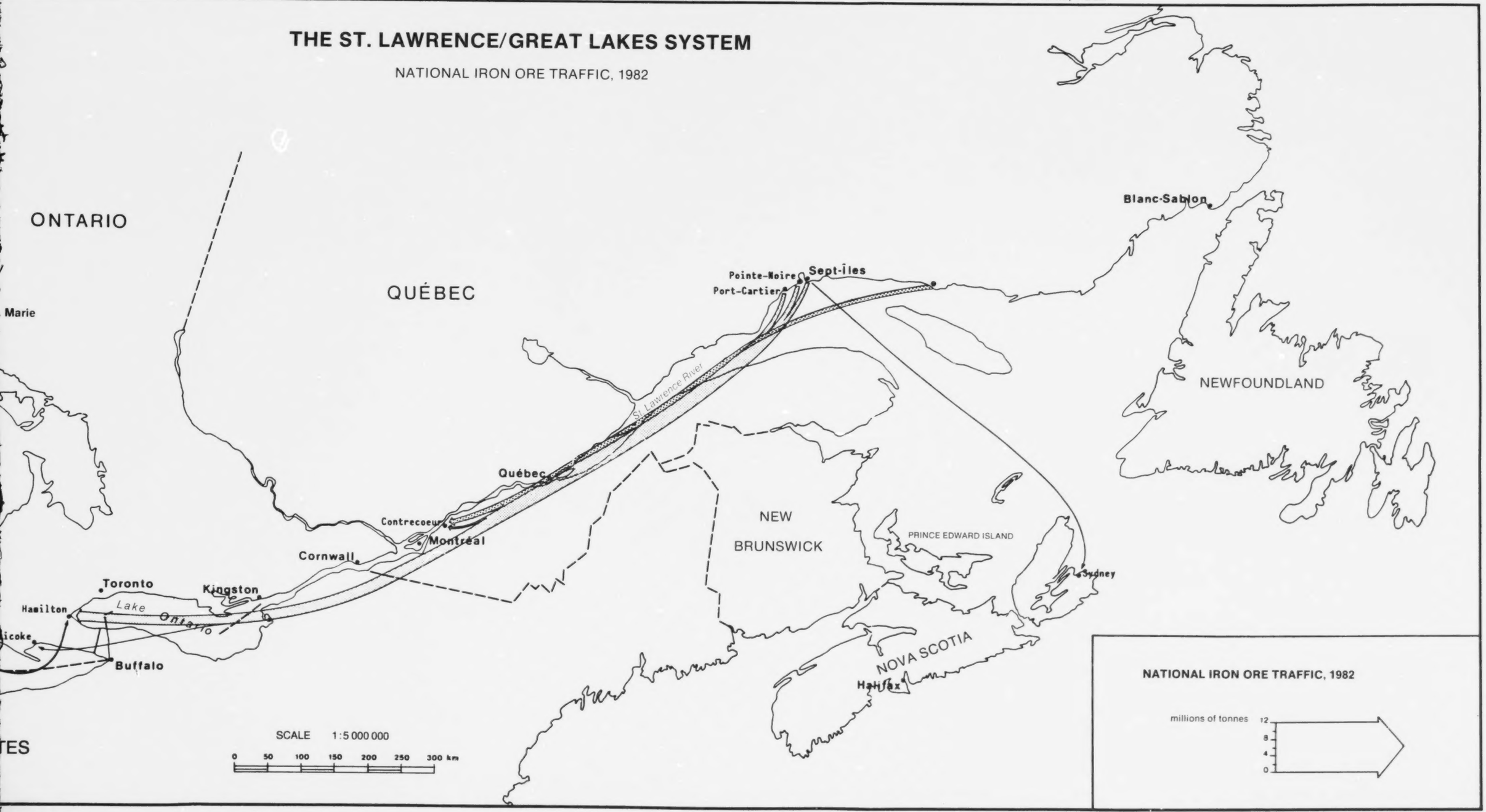
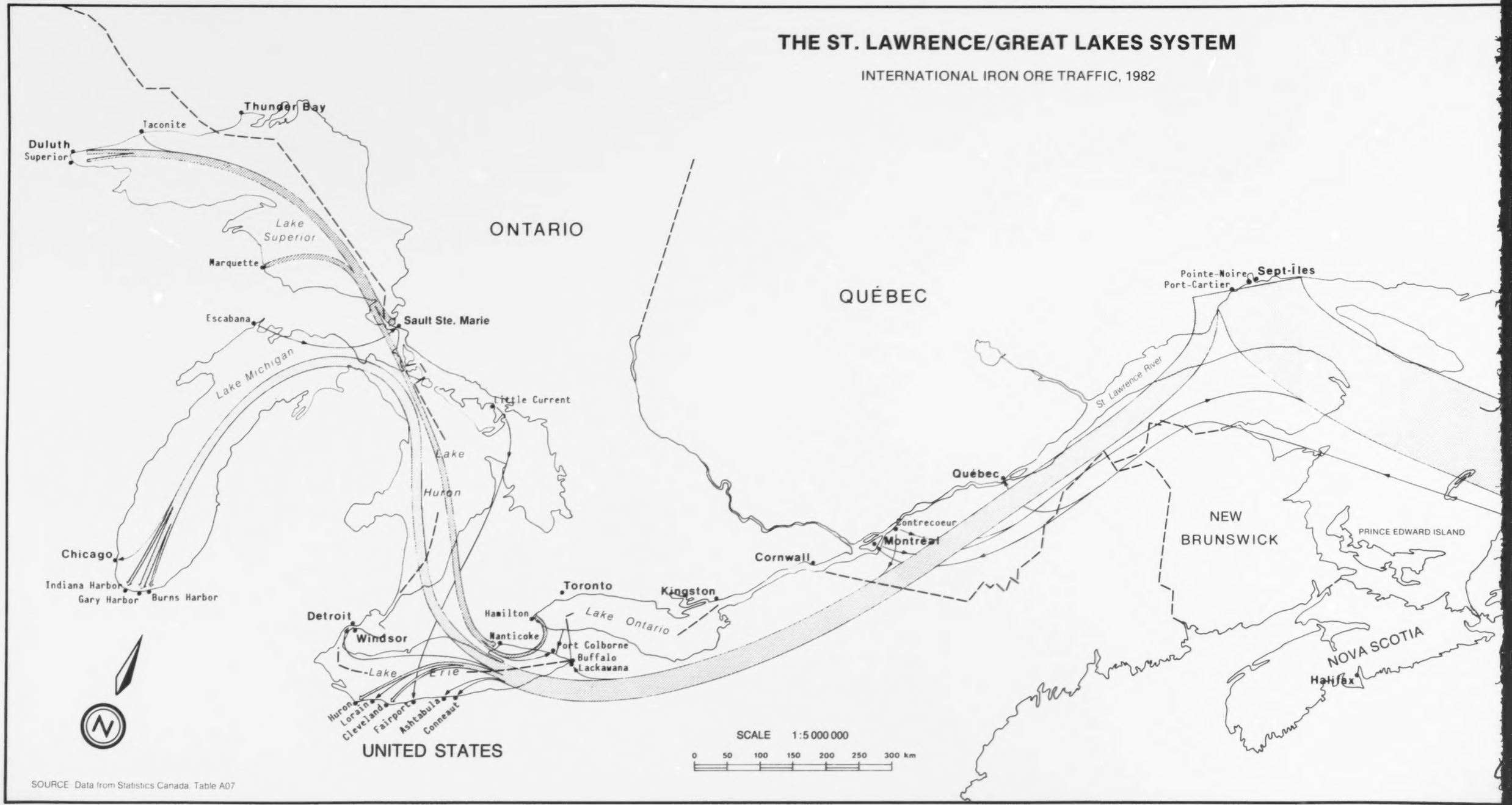


Table 42

The St. Lawrence/Gr
International iron ore f

THE ST. LAWRENCE/GREAT LAKES SYSTEM

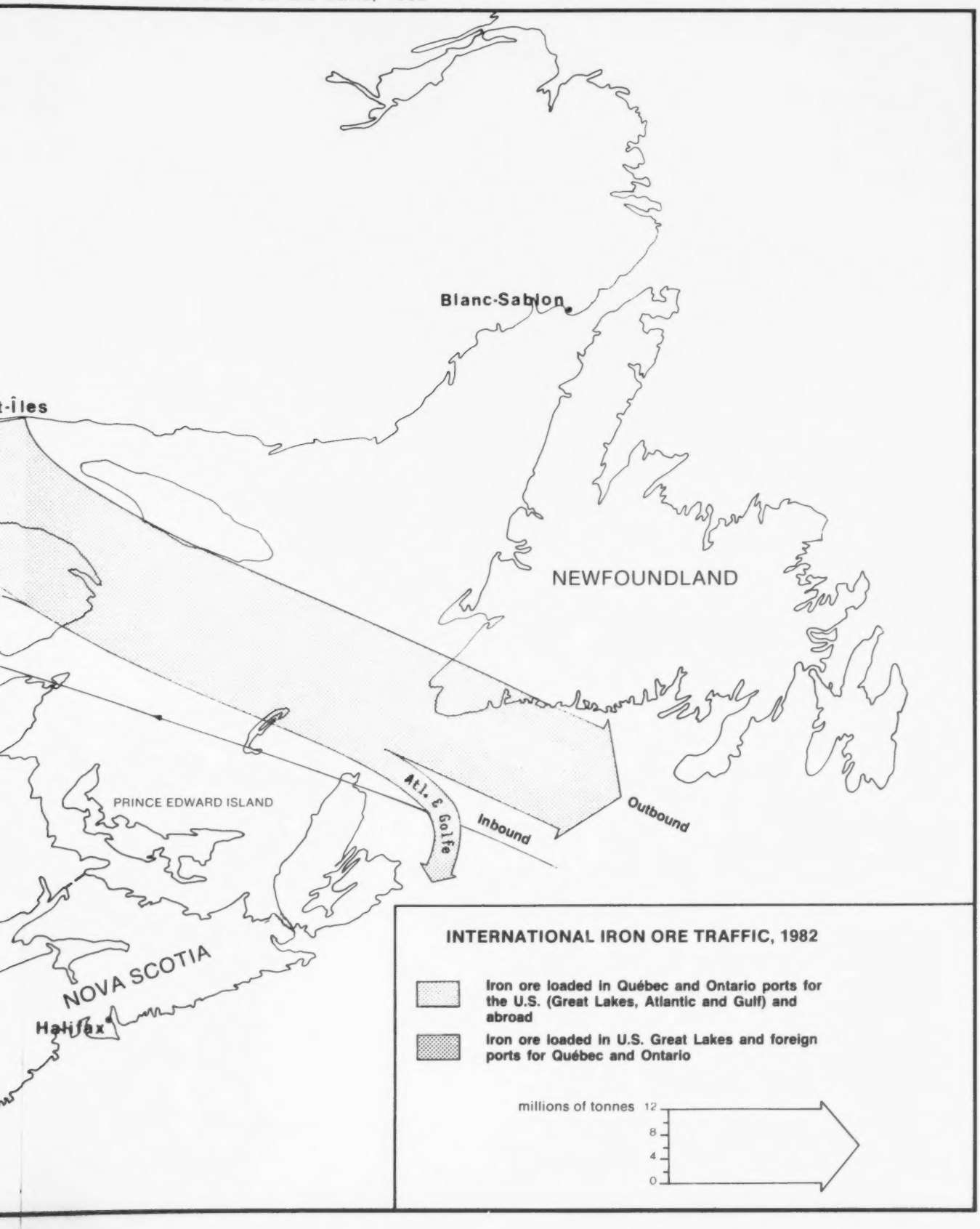
INTERNATIONAL IRON ORE TRAFFIC, 1982



SOURCE: Data from Statistics Canada, Table A07

Table 42

The St. Lawrence/Great Lakes System
International iron ore traffic, 1982



Coal and Oil

One may well say that coal's hours of glory coincided with the beginning of the industrial era. It was far and away the one source of energy that could be transformed into work. Oil quickly, or abruptly, replaced it in nearly all large scale operations. For a long time no one imagined things could return to the state they were in before. But the "oil crisis" has upset many firmly held convictions. There is much talk of a new boom in coal. We will not go into this debate, except to touch on the situation insofar as it affects Laurentian maritime transport.

To begin with, let us keep in mind that there is an abundance of coal outside the OPEC countries. The United States has the largest proven reserves in the world, more than 320 billion tonnes. Australia, South Africa, Canada, the USSR, China, the U.K., Poland and Western Europe also have substantial reserves.

An idea of the main coal deposits in Canada and the United States can be had from the map in Table 43.

The new boom in coal can already be seen in the direct burning of coal for steam to produce electricity, or in its conversion by gasification or liquefaction. The main use has been in the production of electricity, and as a substitute for oil in thermal power stations.

The boom nevertheless has somewhat tapered off as conservation programs have measurably reduced the demand for energy, and as preferences have been shown for nuclear energy in some countries. Furthermore, coal burning plants often cause environmental problems involving acid rain. Expensive pollution control measures can be avoided by burning coal with a low sulphur content. But while this coal is less polluting, it also gives off less heat, and often requires alteration of the boilers.

European demand for overseas coal has been further reduced by an agreement between Western Europe and the USSR on Siberian gas, as well as by the resumption of production in Polish coal mines.

Several countries are continuing research on coal gasification and liquefaction in an effort to reduce costs to a point where they will be competitive with the price of OPEC oil. South Africa already gets 40 % of its oil from coal. The United Kingdom, Japan, Canada and the United States have pilot projects, though the United States is pursuing this research with less commitment than the others, despite its dependence on OPEC for part of its oil supply.

The United States government has given full support to the coal industry in selling as much of its steam coal as possible abroad, though the country is still cautious about long-term investment in transport equipment: railways, port facilities, coal pipelines, etc.

It is hoped that one day coal can be converted at the mouth of the mine or even in situ underground, and that the resulting gas or oil can then be conveyed by pipeline. Railways, bulk carriers and port installations would then become more or less superfluous.

In the meantime, if the United States continues its efforts to export crude coal, Québec and the Great Lakes states should promote the St. Lawrence as an outlet, and persuade coal exporters to use its installations, or to build new ones if need be.

Five major studies have recently been completed on world coal trade between now and the year 2000 :

(a) O.E.C.D. (1974),
Perspectives énergétiques jusqu'en 1995, Paris, Vol. 1, 273 p.p.

(b) WILSON, Carroll L. (1977),
Energy: Global Prospects, 1985-2000, Report of the Workshop on Alternative Energy Strategies, Cambridge, M.I.T. Press, 291 pp.

(c) WILSON, Carroll (1980),
Report of the World Coal Study,
Vol. 1 *Future Coal Prospects: Country and Regional Assessments*, 577 pp.
Vol. 2 *Coal: Bridge to the Future*, 247 pp.
WOCOL, Gallinger Publishing Co.

(d) Chase Manhattan Bank (1981),
World Coal Outlook, the year 2000: Opportunities and Uncertainties, 49 pp.

(e) O.E.C.D. (1982; study brought up to date in June 1984), *Offre et demande mondiale de charbon*.

All these studies forecast a considerable rise in the demand for steam coal for electricity production between now and the year 2000, especially in the industrialized countries of the O.E.C.D.; these are the countries with inadequate reserves, which must import. On the other hand, the demand for metallurgical coal will not rise as rapidly.

Table 43

Main Coal Basins of Canada and the United States

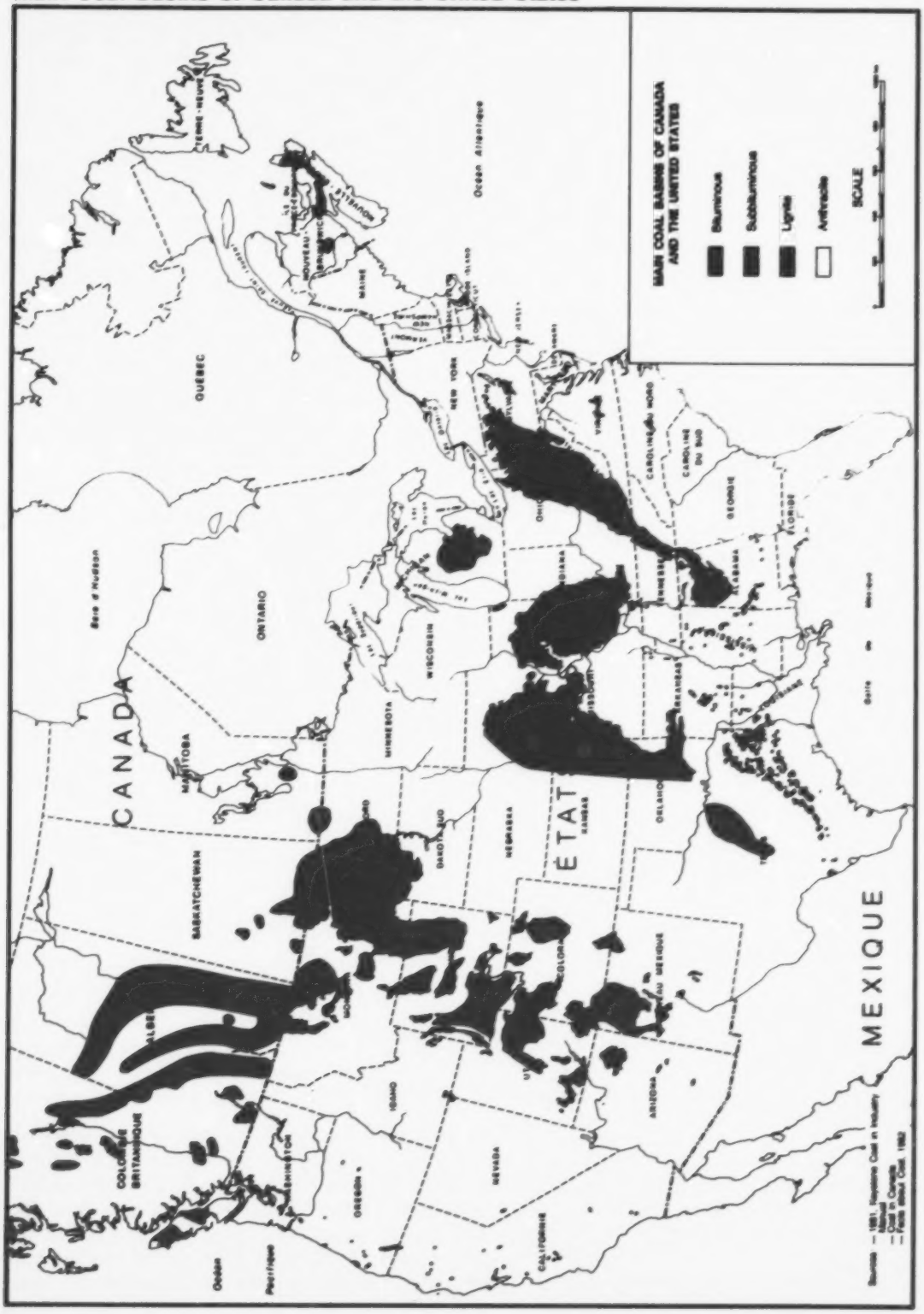
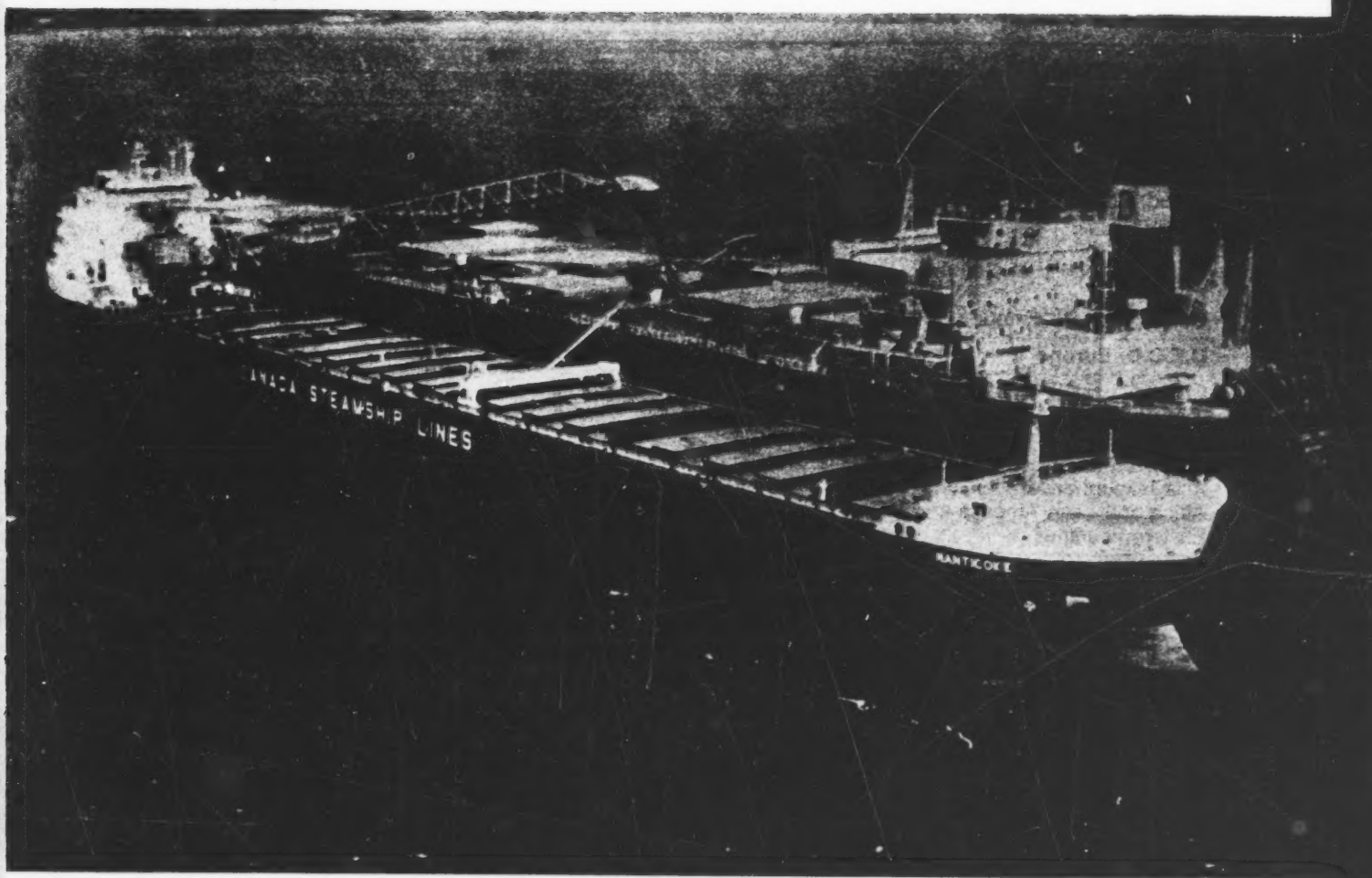


Photo: Canada Steamship Lines



Transhipment of coal in the bay of Sept-Îles.

Total imports of steam coal, under two assumptions, conservative (a) and optimistic (b), would be as shown in Table 45.

The main exporting countries estimate that their export potential to meet these demands would be as shown in Table 46.

It will be seen that Canada and the United States are, and will continue to be, unequal participants in supplying this coal.

Canadian reserves are located mainly in the west, and they will no doubt go mainly to markets in Japan and Asia. As might be expected, they will be shipped primarily from Pacific ports; the large coal terminal at Ridley Island on the west coast was built with this in mind.

On the other hand, U.S. coal reserves are spread all over the country, and judging from 1981 traffic, Western Europe will be the major market. The overall situation is shown in Table 47.

Table 44

World Wide Forecasts for Steam Coal Imports (1985-2000)
(millions of tonnes)

Assumption	1985	1990	2000
a	105	167	302
b	149	259	686

Source: WILSON, Carroll L., (1980), *Coal, Bridge to the Future*, WOCOL, World Coal Study, p. 19.

Table 45

World Steam Coal Imports by Country and Region
(millions of tonnes)

	1977	1985		2000	
		a	b	a	b
Denmark	4.6	10.7	11.1	9.4	20.9
Finland	4.1	3.4	3.4	7.7	12.4
France	14.	11.	34.	26.	100.
United Kingdom	1.	—	—	—	15.
Italy	2.0	10.3	10.9	16.5	45.5
Holland	1.5	7.0	7.0	19.9	34.2
Federal Republic of Germany	3.	9.	11.	20.	40.
Sweden	0.3	2.9	3.2	14.3	23.1
Others Western Europe	7.	13.	13.	32.	42.
O.E.C.D. Europe	**37**	**67**	**94**	**146**	**333**
Canada	6	6	5	8	4
Japan	2	6	7	53	121
Total O.E.C.D.*	**45**	**80**	**105**	**210**	**460**
Asia (except Japan)	—	5	24	60	179
Africa and Latin America	1	3	3	6	10
Eastern countries	17	20	20	30	30
Total world*	**60**	**105**	**150**	**300**	**680**

* Totals have been rounded off.

Source: WILSON, Carroll L., (1980), *Coal, Bridge to the Future*, WOCOL, World Coal Study, p. 20.

Table 46

Estimated Coal Export Potential for Exporting Countries
(millions of tonnes per year)

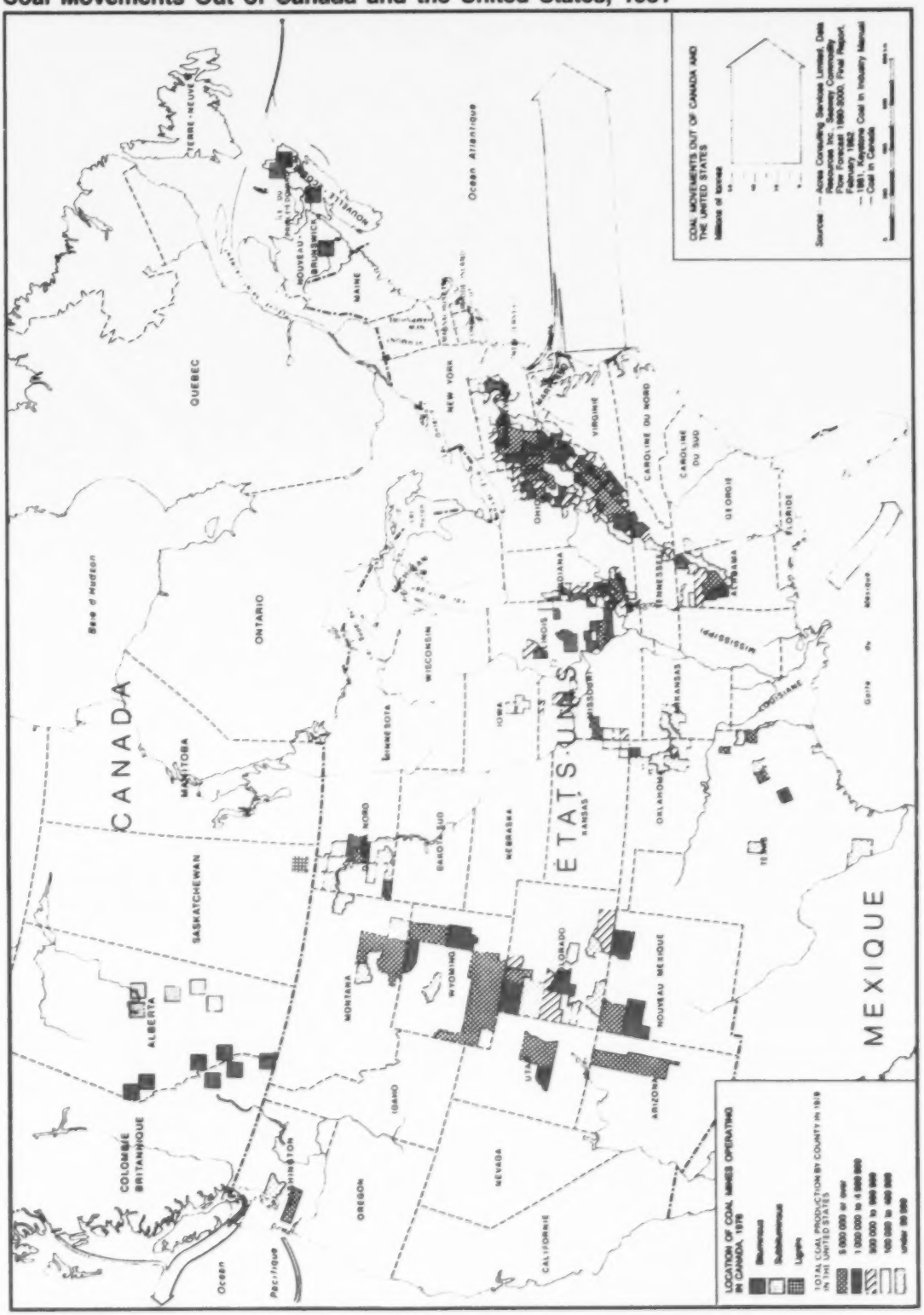
	1977	2000	
		Present Forecasts	Estimated Maximum Potential
Australia	38	160	200
Canada	12	27-47	67
United States	49	125-200	350
India and Indonesia	1	5	ND
Poland	39	50	50
Republic of South Africa	12	55-75	100
Federal Republic of Germany	14	23-25	ND[1]
People's Republic of China	3	30	ND
Soviet Union	25	50	ND
Latin America, Africa, others	7	25-50	ND
World total	**200**	**550-700**	**930**

1 ND = Not determined

Source: WILSON, Carroll L. (1980), *Coal, Bridge to the Future*, WOCOL, World Coal Study, p. 20.

Table 47

Coal Movements Out of Canada and the United States, 1981



It would appear that the routes for export of American coal and grain are basically the same: the Mississippi, the West coast, the St. Lawrence-Great Lakes system and the East coast. But the order of importance is different for coal and grain:

COAL	GRAIN
(1) East coast	Mississippi
(2) West coast	West coast
(3) Mississippi	Great Lakes/ St. Lawrence
(4) Great Lakes/ St. Lawrence	East coast

For the St. Lawrence Seaway, it should be noted that traffic from 1959 to 1982, in the Welland Canal section and in the Montréal-Lake Ontario section, followed the pattern shown in Tables 15 and 16.

If we take the 1982 Canadian and international traffic separately, we get a situation as described in Tables 48 and 49; like Tables 41 and 42 dealing with iron ore, these are not intended to give a comprehensive picture of coal traffic on the St. Lawrence-Great Lakes system.

Until a short time ago, the American east coast ports of Hampton Roads, Baltimore and Phildelphia handled most of the American coal exports. And then quite recently the southern ports of New Orleans and Mobile began to be used more extensively.

American circles apparently do not find the St. Lawrence-Great Lakes system a very suitable or valid route. Wilson's studies (WOCOL, 1980) clearly bring this out. This view also emerged at the meeting of the American Association of Port Authorities held at Mobile in 1981.

And yet on closer examination, it will be seen that American coaling ports on the Great Lakes can handle greater quantities of coal than the coast ports. And the Great Lakes ports have bulk storage areas. This can be verified by Table 50.

An interesting comparison can be made of the characteristics of the Hampton Roads port in Virginia with data about the St. Lawrence-Great Lakes system.

Hampton Roads was developed for the export of metallurgical coal, which calls for an exact mixture of various grades of coal. Yet there are no bulk storage areas at the port. Thousands of cars wait on railway sidings to be unloaded in turn on the conveyor. Further, access to the port is only via a passage over the Chesapeake Bay tunnel with a clearance of 16.7 metres. Moreover, the channel is only 13.7 metres deep. Hampton Roads consequently cannot handle ships over 80 000 tonnes.

In the St. Lawrence-Great Lakes system, which does have suitable coal storage areas at its ports, coal can be transhipped at Québec to 135 000 tonne vessels with a draught of 15.2 metres; Sept-Îles, which has a draught of 18.3 metres, can handle ships of 200 000 tonnes and over. When Thyssen Carbometal negotiated prices with the various concerns along the line (mines, railways, lakers, ocean-going vessels) it obtained an average price that was completely competitive throughout, in comparison with other routes. These calculations did not even take into account demurrage charges at Hampton Roads. This was a revelation for a number of coal dealers. Will this perhaps suggest the Seaway route as one to be considered among others in the future?

Table 51 gives the figures that Thyssen Carbometal negotiated in 1982 for shipping Pennsylvania coal to the Far East.

Another factor should be kept in mind: the rapid changes in American railway transportation costs as a result of deregulation. Coal dealers in the American East are right to be concerned about this, as it can place them at a disadvantage on world markets. The railway sections on the St. Lawrence-Great Lakes routes are noticeably shorter than those to the east coast. Deregulation could thus increase the attractiveness of the Seaway route as soon as the market picks up. In 1983, Hampton Roads had to reduce its shipments to 30 million tonnes, but expectations are that the market will soon recover. Why should the St. Lawrence-Great Lakes route not take over a goodly share of shipments to major world markets?

SOURCE: Data from Statistics Canada, Table II

THE ST. LAWRENCE/GREAT LAKES SYSTEM

NATIONAL COAL TRAFFIC, 1982

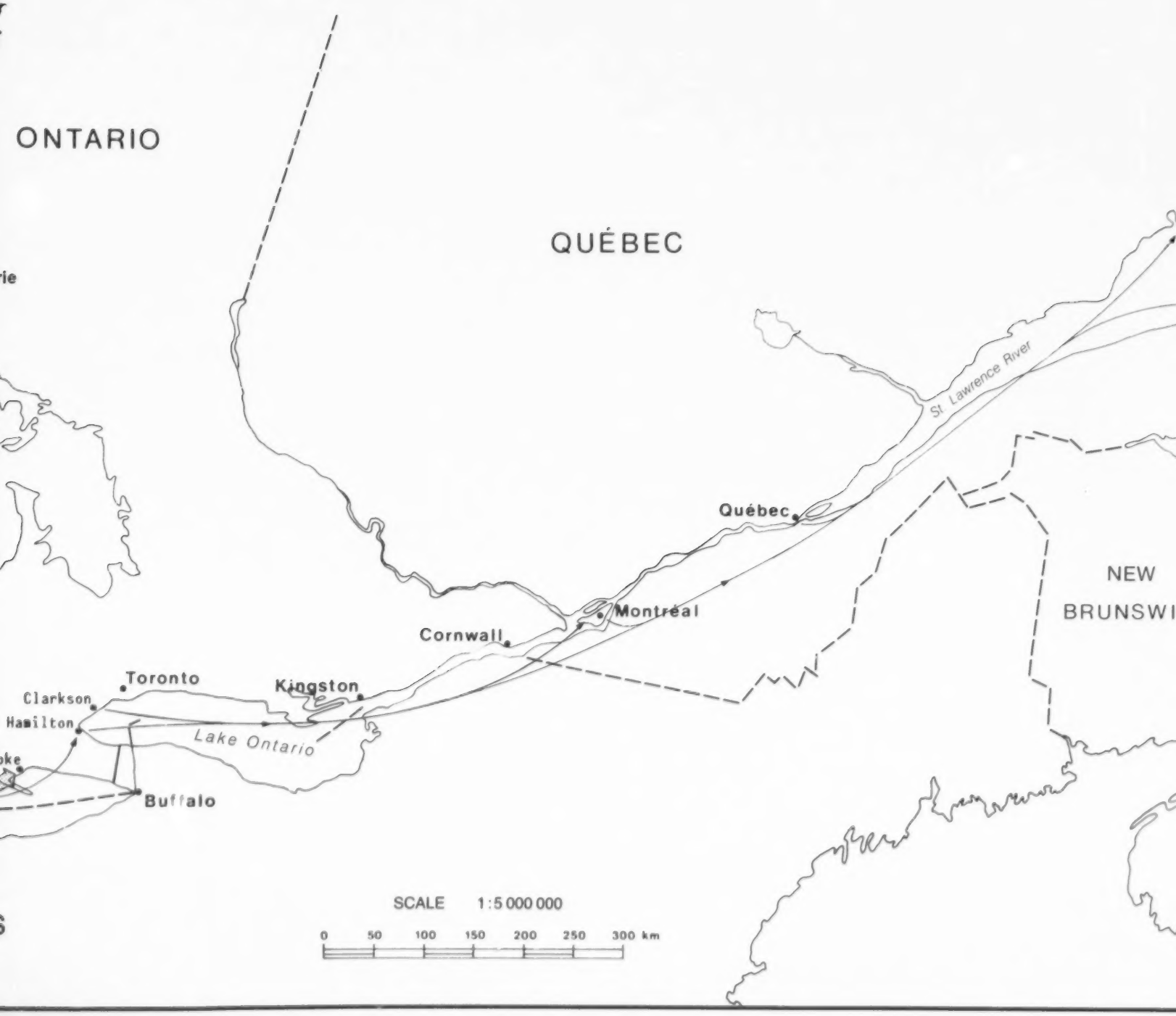


Table 48

The St. Lawrence/Great Lakes System
National Coal Traffic, 1982

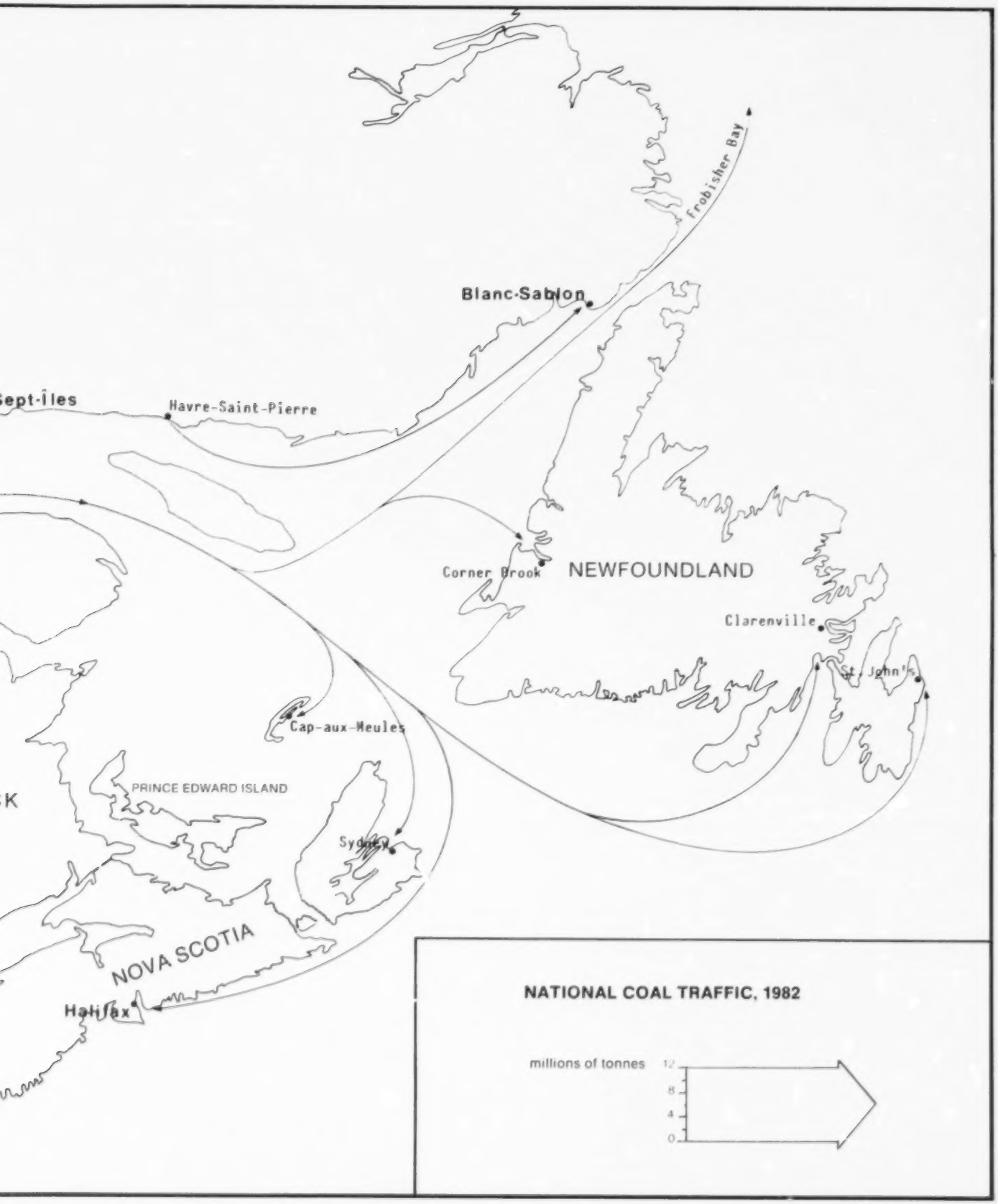
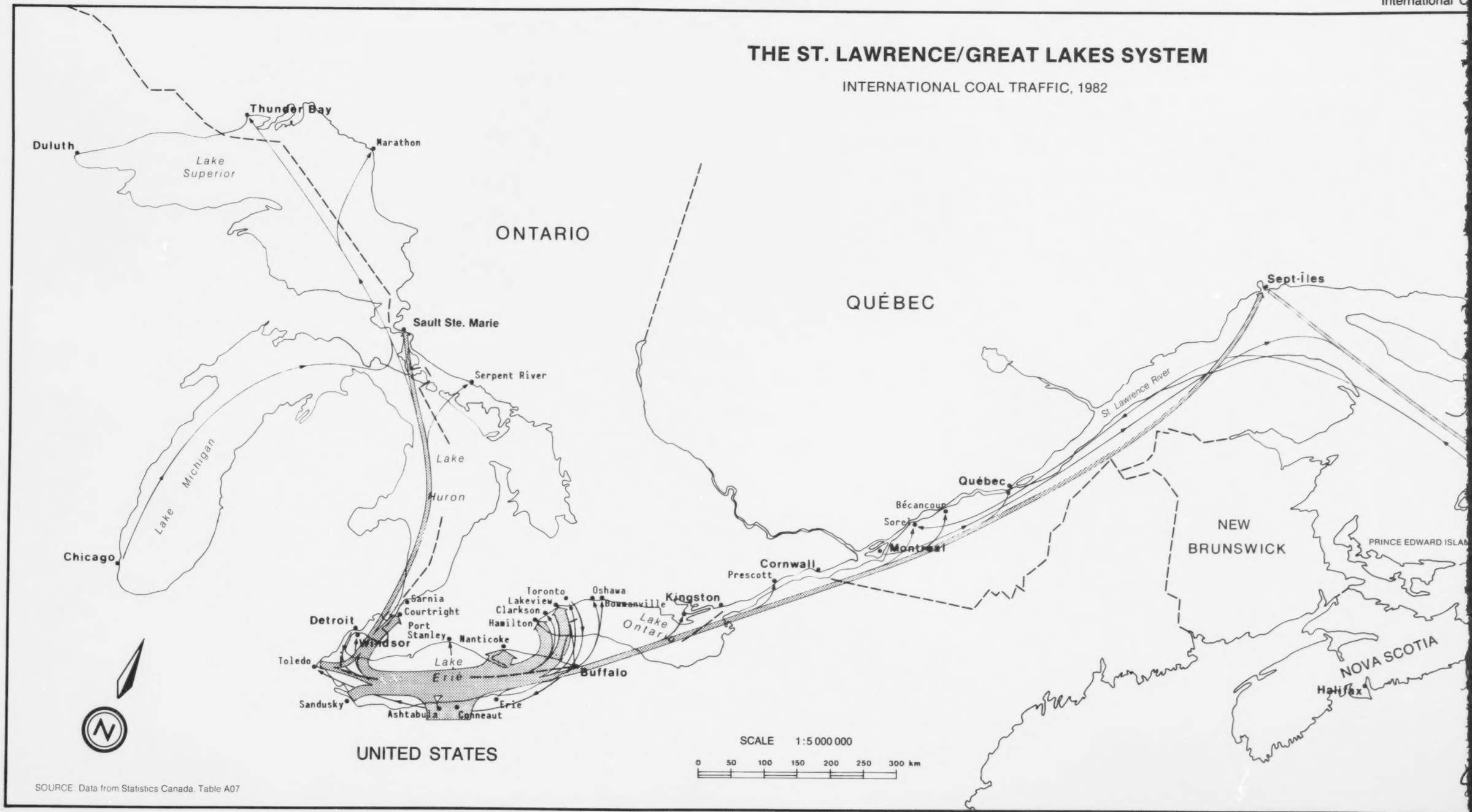


Table 49
The St. Lawre
International C

THE ST. LAWRENCE/GREAT LAKES SYSTEM

INTERNATIONAL COAL TRAFFIC, 1982

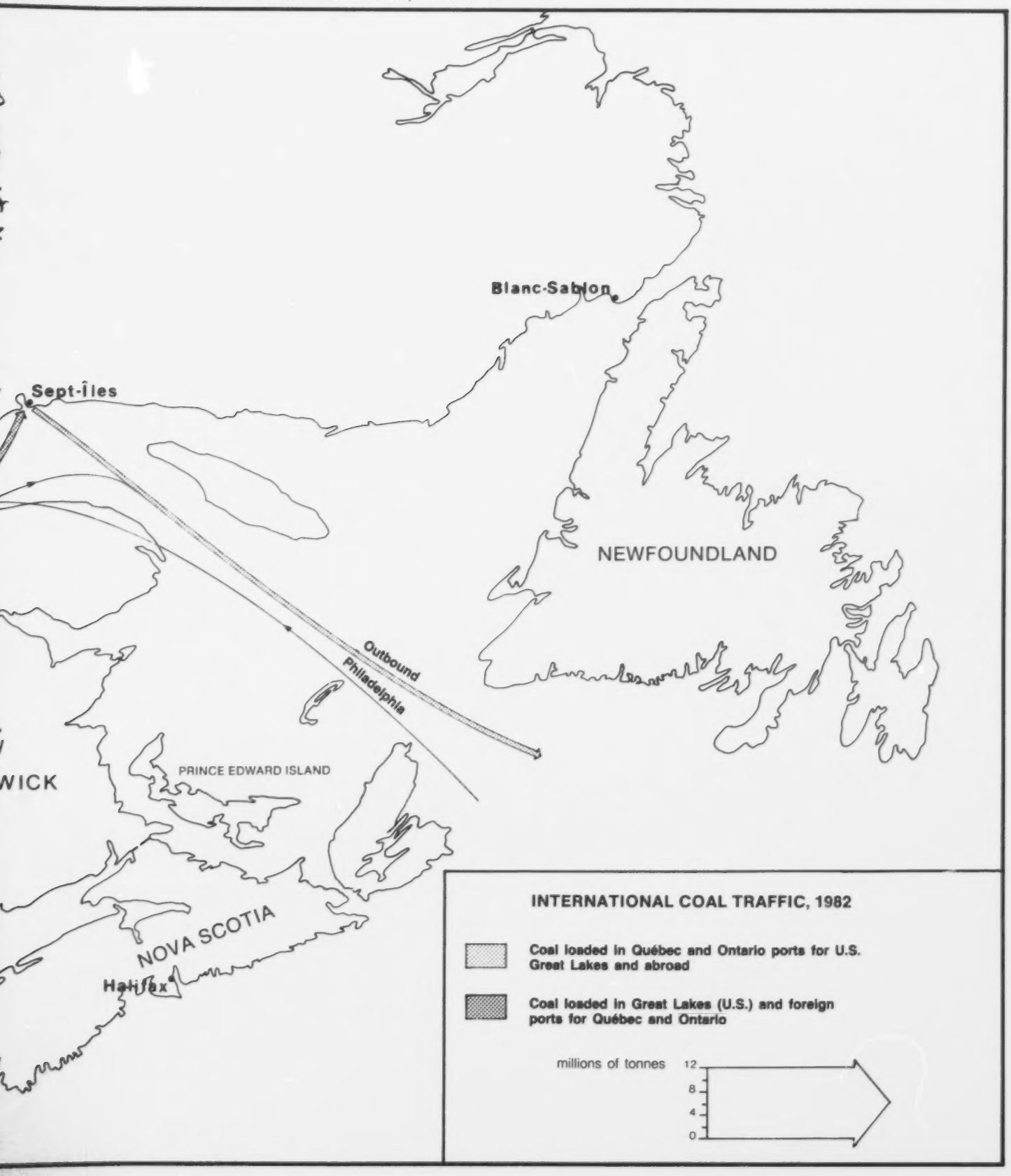


SOURCE: Data from Statistics Canada, Table A07

Table 49

The St. Lawrence/Great Lakes System

International Coal Traffic, 1982



We now turn to the estimates of the *Seaway Commodity Flow Forecast 1980 to 2000*. These are for no more than 4 to 5 million tonnes a year between now and the year 2000. We think this is much too low. The results of careful marketing — to take the case of Thyssen Carbometal — would prompt us to think in terms of doubling the forecasts of Acres Consulting Services and Data Resources. If we take the port of Québec alone, in 1980 it handled a little more than 2 million tonnes, and we had only begun to promote the advantages of the St. Lawrence-Great Lakes route. To be sure, current sudden changes in the interrelated markets of coal and oil make predictions uncertain; this is all the more reason to follow these questions very closely.

There is no need to dwell at length on oil, as the basic facts are well known. On the one hand, economic fluctuations make it difficult to project major trends; and on the other, only a modest share of total traffic comes by sea, most of ours coming by other means.

Table 50

Great Lakes and St. Lawrence Coal Ports
(short tons)

Ports'	Draught (in feet)	Loading Capacity (in t/h)	Storage Capacity (in Mt)	Effective Capacity (in Mt/year)	Shipments in 1981 (in Mt)	Surplus Capacity (in Mt/year)	Rail Companies Providing Services
Ashtabula	27	6 000	1.8	8.0	4.92	3.08	Consolidated Rail Corporation (Conrail)
Buffalo	27	2 200	.3	.3	0	.3	Conrail
Chicago	27	2 500	.45	8.0	1.7	6.3	Belt Railway Company of Chicago
Conneaut	27	2 200	6.0	13.5	8.55	4.95	Bessemer and Lake Erie Railroad Company
Erié	27	7 200	.1	.4	.11	.29	Conrail and Bessemer
Sandusky	27	6 000	.85	7.5	5.55	1.95	Norfolk and Western Railway Company
Superior	27	11 500	7	18.0	4.2	13.8	Burlington Northern
Toledo	27	6 000	.5	24.0	12.33	11.67	Chesapeake and Ohio (Chessie), Conrail and Baltimore and Ohio Railway
Thunder Bay	27	8 000	1.25	6.0	2.3	3.7	Canadian National and Canadian Pacific
Contrecoeur	37	1 000	.07	5.0	.3	4.7	Canadian National
Québec	50	2 000	.4	3.0	0.5	2.5	Canadian National and Canadian Pacific
Montréal	35	750	.1	.5	.2	.3	Canadian National and Canadian Pacific
Hampton Roads	45	9 000	*	50.0	47.4	2.6	Norfolk and Western, Chessie System

Source: — *Statistics supplied by the Ports.*
— *Frederic J. Pitre, Marketing and Planning, Canada Steamship Lines Inc. "World Shipping Needs for the Growing Boom in Coal Export", International Coal Conference, Washington, D.C., May 4-5, 1981.*
— *Statistics Canada.*
— *Maritime Administration — Great Lakes Region in "Coal Transportation and Distribution", Chicago, September 1982.*
— *U.S. Department of Transportation (1982) Great Lakes/Overseas Export Coal Trade — Summary of 1982*, Cleveland, Ohio, p. 5.

* In 1981 there was no ground storage area at Hampton Roads. However, 7 000 to 8 000 cars could be parked on sidings before being unloaded.

1 Even if the port of Sept-Îles does not at present have any ground installations for handling coal, for a number of years it has carried out transhipment from ship to ship off the port. It can accommodate the world's largest cargo vessels. In 1981, 800 000 tonnes of coal were shipped this way from the port of Sept-Îles.

Table 51

Shipping Costs of Pennsylvania Coal to the Far East
(Prices negotiated by Thyssen Carbometal in 1982, in U.S. dollars)

Land Transport	Shipping Ports	Tonnage of Ships Used	Price (tonne)
Rail Baltimore and Ohio	Curtis Bay (Baltimore)	60 000	$41.11
Conrail	Greenwich Pier (Philadelphia)	60 000[1]	$40.71
Baltimore and Ohio	Convington (Baltimore)	60 000	$42.94
Chesapeake and Ohio, Ohio	Newport News (Hampton Roads)	90 000[1]	$39.06
Bessemer and Lake Erie	Conneaut and Sept-Îles	150 000[2]	$36.14
Truck	Ashtabula and Sept-Îles	150 000[2]	$36.06

1 Loading completed off the port.

2 Conneault and Ashtabula: 30 000 tonnes.

Source: Actes du Colloque international sur le système Grands Lacs/Saint-Laurent (1982), p. 12.

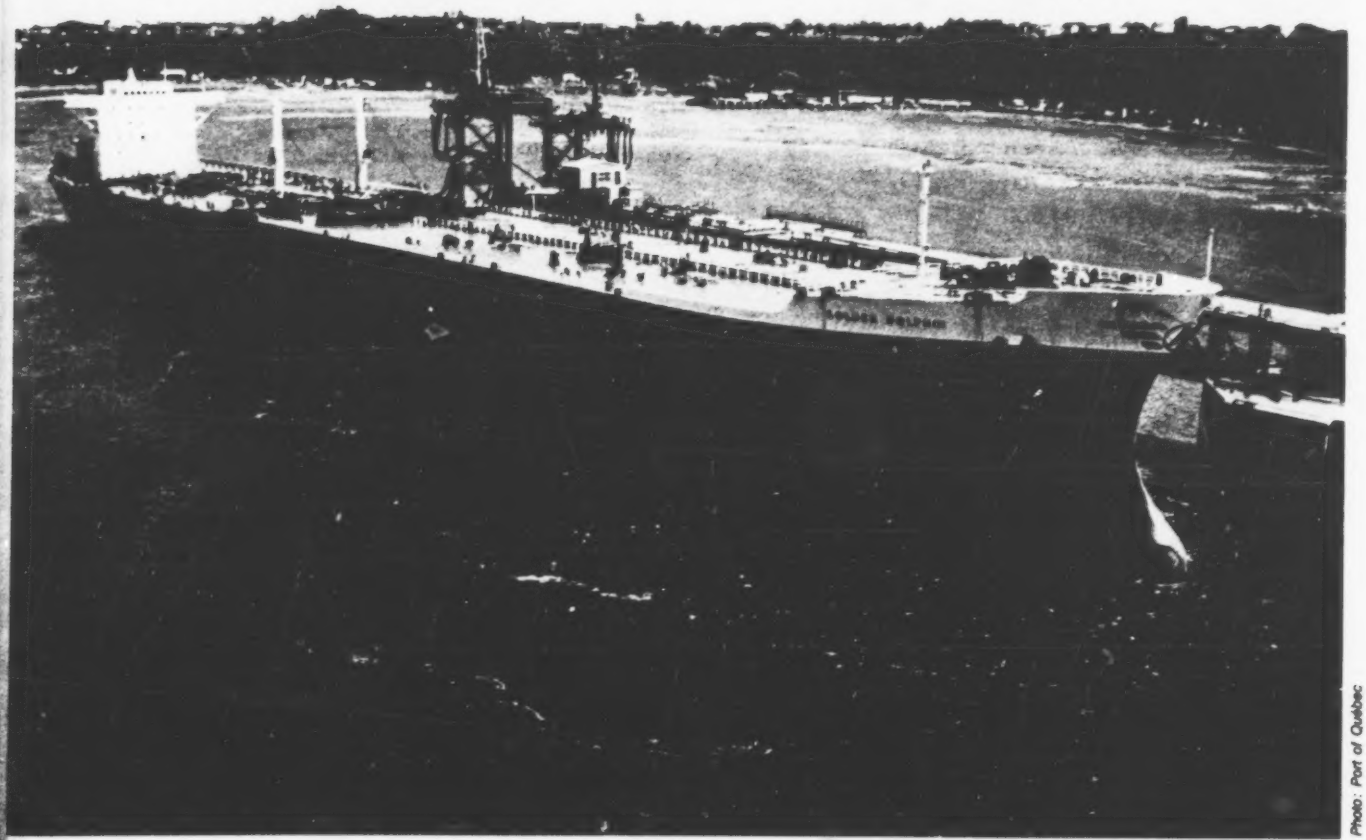


Photo: Port of Québec

In 1981, 6.5 million tonnes of crude oil and 1.2 million tonnes were handled in St. Lawrence River ports.

Table 52

Canadian Petroleum Product Forecasts
(thousands of tonnes)

	Montréal — Lake Ontario		Welland Canal		Combined	
	Upbound	Downbound	Upbound	Downbound	Upbound	Downbound
1985	1 500	670	490	790	1 740	1 070
1990	1 500	670	490	790	1 740	1 070
1995	1 500	670	490	790	1 740	1 070
2000	1 500	670	490	790	1 740	1 070

Source: Acres Consulting Services Limited and Data Resources Inc. (1982), *Seaway Commodity Flow Forecast 1980 to 2000*, pp. 6-19.

It is true that the in and out shipments of crude and refined petroleum products are usually a sizeable part of the traffic in the world's great ports; they usually supply refineries and petrochemical industries. And it is equally true that Montréal has long been an important refining centre, but the Montréal petrochemical industry is supplied primarily by pipeline.

Until 1979 the Portland, Maine, pipeline, built in 1941, brought in 20 to 25 million tonnes of crude petroleum to Montréal every year, according to data from Statistics Canada. Since 1979 Montréal refineries have been supplied primarily by the pipeline from the Canadian west. From 20 to 23 million tonnes come in this way, while the Portland pipeline now brings in only 7 to 9 million tonnes.

The Québec City region has one refinery, that of Ultramar at Saint-Romuald. It is supplied by tankers, which in 1981 brought in 3.5 million tonnes of crude petroleum.

In 1981 the ports of Montréal and Québec together handled 6.5 million tonnes of heating oil and 1.2 million tonnes of gasoline. Most of this was distributed further toward the Great Lakes, and along the St. Lawrence and the Saguenay. Québec regional supply ports in the same year received, from Saint John, 310 000 additional tonnes of heating oil and 264 000 additional tonnes of gasoline.

Forecasting in this area is especially difficult, if not largely guesswork, because of the recent economic crisis, the frequent shifts in traffic flow upbound or downbound, and the installation of the western pipeline. The authors of the *Seaway Commodity Flow Forecast 1980 to 2000* consequently have been very cautious in their treatment of the Seaway. They have made stationary projections, based on declining consumption due to rises in prices and greater energy conservation. Moreover, the figures do not assume any regular growth in economic activity, which would increase projections by 85 %.

Table 52 gives the forecasts for petroleum products moving on the Seaway.

Under these circumstances, we do not think it useful to attempt further projections of petroleum traffic on the St. Lawrence and the Great Lakes. It certainly is not an unimportant area. But we can go no further than to anticipate a relative stability in traffic along the Seaway route.

Other Bulk Products

In addition to grain, iron ore, coal and petroleum products, there are many other materials that can be shipped in bulk. A number of them are carried on the St. Lawrence: salt, bauxite, alumina, forest products, asbestos, silica, water, granite, and still more.

Each one of these taken separately does not represent much volume compared with grain and iron ore. Together, they make up an appreciable amount of traffic, whose very diversity can be an advantage. We will take up the main ones, in turn.

Salt

In the case of salt, we refer to the deposits of the Îles-de-la-Madeleine operated by the Mines Seleine. A production of 1 200 000 tonnes is projected. At present, the company supplies the ministère des Transports with 400 000 tonnes of salt annually for de-icing Québec roads in winter, everywhere except in the Outaouais. The municipalities, on the other hand, are reaching the end of their contracts with other suppliers, mainly in Ontario.

If in the medium term the Mines Seleine company could obtain some of the municipalities as customers, it could raise its sales of salt, and hence the maritime traffic, to 900 000 tonnes a year.

In addition, serious consideration is being given in Québec to the production of chloralkali. We would then have to increase the above figures by 100 to 125 000 tonnes, for a total of more than one million tonnes.

Bauxite and Alumina

The aluminum industry is firmly established in Québec, where it has good deep water ports and an ample supply of electricity. Its further development seems assured, and it is a major user of maritime transport. Its incoming raw materials — bauxite, alumina, oil coke, caustic soda and aluminum fluorides — arrive in Québec ports; it imports from Brazil, Guinea, Guyana, Jamaica, the United States and Argentina. Through the same ports, it exports to Japan, China and Europe.

In 1982, the main mills in Québec produced annually one million tonnes of aluminum divided, according to company data, as follows:

Companies	Annual Production Capacity (thousands of tonnes)
Alcan Aluminium	
Grande Baie	172
Alcan Smelters & Chemicals Ltd.	
Arvida	432
Isle-Maligne	73
Beauharnois	47
Shawinigan	84
Reynolds Aluminum of Canada	
Baie Comeau	170
Total	**978**

Industry requirements by sea transport in 1982 and 1983, for lower production than these amounts, came to about:

	(thousands of tonnes)
Bauxite	2 259
Alumina	586
Oil coke	354
Oil	246
Caustic soda	123
Fluorides	50
Total	**3 618**

Expansion of the Reynolds plant and construction of the Péchiney plant at Bécancour as well as Alcan's development at Laterrière should increase annual imports to about 5 to 6 million tonnes. Exports by sea could easily reach half a million tonnes. This is an impressive amount of regular traffic.

Forest Products

Maritime transport of bulk forest products has a long and rich history in Québec. The huge rafts of logs with their intrepid drivers are still objects of admiration. What can one say of the courageous and skilful captains of coastal schooners who loaded their vessels the way container ships are loaded today, so high they could not even see ahead of them from the wheelhouse! Loading and unloading was done by hand, at the dock or on the beach. Do we know how much wood was exported in the 18th and 19th centuries? Do we remember the wily Scots brothers so appropriately named Charles and John Wood!

In 1824 at Anse au Fort on the western end of the Île d'Orléans a colossal wooden vessel was launched: the *Columbus*, 3 690 tonnes, could carry 6 300 tonnes of cargo. The purpose: to sell the wood it carried, and then to sell the wood the ship was made of!

The maritime market and transport of forest products have diversified since then, and today there are three major categories: newsprint, pulp and lumber.

In tonnes, approximately the following quantities were handled for the international market in 1982:

Newsprint	655 183
Pulp	202 616
Lumber	470 546
	1 328 345

Lately Québec has been seeking new markets for lumber overseas, particularly in the Middle East, North Africa and Western Europe. But there is also coastal transport, especially for billets. This is mainly between the north shore, Gaspésie, Anticosti and the regions around Québec City and Trois-Rivières. The Kruger and Reed pulp companies, to mention two large and active ones, use mainly barges and tugs to transport wood on the St. Lawrence; they move about 300 000 tonnes annually.

Photo: Port of Québec

Wood chips for Finland — autumn, 1983.

Recently, at the beginning of October, 1983, Sovebec, Inc. undertook to ship wood chips from the port of Québec to Finland. The first load was 15 000 tonnes. But such shipments should be incidental in the future since the Québec pulp industry will need all Québec's chips to counteract the shortages of raw materials that are forecast.

If wood no longer dominates maritime trade, it is still very much in evidence on the St. Lawrence.

Asbestos

More than 85 % of Canadian asbestos fibre is produced in Québec.[1] Canada, as everyone knows, is one of the two major asbestos producers in the world. With more than 95 % of its production going abroad, it is the world's principal exporter.

In 1976 this translated into about 1.8 million short tons of Canadian exports, of which 1.5 million tons came from Québec. The market has weakened since then, dropping from one million tons in Québec in 1979 to 760 000 tons in 1982.[2]

Shipments overseas, to the Far East and other destinations are made primarily from the port of Montréal, and also from the port of Saint John. Japanese carriers, for instance, insist on picking up asbestos at Saint John, where they stop on their way from New York to Japan.

Given the present state of the world market, there is hope — though with serious reservations — that there will be larger shipments in the next few years.

Silica

The Québec ministère de l'Énergie et des Ressources recently commissioned a study on the Eastern Canada market for silica.[3]

What emerges is that users are looking for reliable quantities as well as quality in their sources of supply. We read:

> For many user sectors there are strict specifications as to the quality of products: this is true for most electrometallurgic and electrochemical industries, for the plate glass manufacturing industry and for foundries, industries that require very high-quality raw materials.

At present, part of the supply for users in Eastern Canada comes from the United States, because of the quality and prices available. But

1 Sorès Inc., (1976), *Le marché des textiles d'amiante*, in cooperation with Arthur D. Little of Canada Ltd., and with the ministère de l'Industrie et du Commerce du Québec.

2 Association des Mines d'amiante du Québec, (February 28, 1983), Communication.

3 PHAN PHY NGOC et al. (1983), *La Silice dans l'Est canadien: étude du marché*, ministère de l'Énergie et des Ressources, Québec.

these imports account for only a third of the requirement, i.e. about one million tonnes per year, at an average price of $24 per tonne.

It is likely that we must soon (i.e. by the year 1990) add one million tonnes to the demand, because of the growth of existing industries and the possible establishment of new projects.

It is thought that there is room for a worthwhile development in silica production in Québec. The quality and quantity are there. The only remaining condition is that it be offered at competitive prices, in which transportation costs are sometimes critical. This is true for the new deposits in Charlevoix.

The project under study is to produce annually 25 000 tonnes of silica and 35 000 tonnes of ferrosilica at Clermont. For this 140 000 tonnes of quartz are needed, but also 80 000 tonnes of coke and coal coming by ship from the American states on the Great Lakes.

In short, this traffic is relatively slight, but growing. And in its way, it is already making a significant contribution to the volume of goods transported in bulk on the St. Lawrence.

Water

This is already much talked of: Québec might very soon be called upon to export drinking water to countries whose supply is small or threatened. In the Persian Gulf, in Africa, in the West Indies, and right here on the Îles-de-la-Madeleine, for example, the need is either immediate or short-to-medium term.

This would be a new business and a new shipping activity on the St. Lawrence, attractive in several ways, because it would provide a backhaul load for ships bringing bulk goods to Québec.

We recently learned that drinking water could soon be exported on a regular basis for the first time, from Sept-Îles to the Arabian Peninsula.

Granite

Québec is gifted with important reserves of high-quality granite in various colours and patterns. As a building material, it is slightly more expensive than marble but is much more durable and resistant to deterioration by atmospheric pollution. Maintenance costs are also minimal. The most common use in commercial buildings is as tiles or for interior and exterior wall panelling. The panels most sought after are two centimetres thick.

In 1980, twenty-seven producers were extracting or processing some twenty types of granite, mainly in the regions of Lac Saint-Jean, Portneuf and Estrie. Some 63 500 tonnes were produced creating about 500 jobs. It is estimated that Québec can hope, in the medium term, to export half a million tonnes with the use of modern technology to meet market requirements and with a better marketing strategy.

Other bulk goods also take the water route via one or other of the ports on the St. Lawrence, or could eventually be transported by ship. To mention only a few: nickel matte, titanium from Havre-Saint-Pierre, gypsum, potash (produced near St. John, New Brunswick) or peat. In all these cases, a close examination should be made of the maritime traffic they generate, or would generate if production, processing, sales or exports were intensified. Within the framework of this report, however, we do not believe that the data available would change the general outlook.

By and large, the bulk market on the St. Lawrence has a number of specific characteristics which set it apart from the international bulk market.

First, there is a surprisingly small quantity of crude oil in the St. Lawrence traffic: world-wide, it is still the highest-volume bulk product shipped.

Secondly, the importance assumed by the laker fleet in the St. Lawrence is a unique and remarkable feature, and at the same time provides a fairly determinant parameter of the maritime trade and transport concentrated there. As most of the ships in the Great Lakes fleet are not seagoing, the economic activity that they directly support is closely tied to local market fluctuations.

Finally, a third important characteristic: the management of the St. Lawrence Seaway charges its users. This is exceptional among all the shipping canals of North America. The users consider these charges to be too steep, and make the point that such tolls are not common in other modes of transport.

All this shows to what point the bulk goods traffic, particularly grain because of its considerable volume, constitutes the veritable keystone of the maritime economy of the St. Lawrence. On this subject, by the way, we should recall the recent remarks of the President of the Great Lakes Waterways Development Association, Mr. Donald Rothwell:

> If the loss of U.S. grain traffic is allowed to continue, the burden of maintaining the Seaway on a self-sustaining basis will fall more and more on the Canadian export grain industry, on Canadian shipping companies, and on Canadian steel and iron ore producers, all of whom have no alternative but to use the Seaway if they are to remain in operation.[1]

The geography of the St. Lawrence is such, in fact, that the River is a major transport artery linking the Atlantic to one of the largest industrial and agricultural zones in the world. Yet this strong position has its vulnerable points: it takes only a sizeable variation in one of the major markets to affect the whole system, favourably or unfavourably as the case may be. This, indeed, was what Mr. Rothwell was saying, in his own way.

From this examination we already see the emergence of some indispensable guidelines to future action. In order to maintain and even increase the share of the St. Lawrence in the market of bulk goods transport, constant vigilance is necessary to ensure the efficiency of its transport system in every respect. In addition, it would be appropriate to undertake a serious promotion campaign.

If we consider, for example, that a considerable part of the cost of delivering bulk goods is attributable to transportation, it at once becomes obvious how favoured the St. Lawrence is by the depth of draught it can accommodate, if only this advantage is known and made the most of.

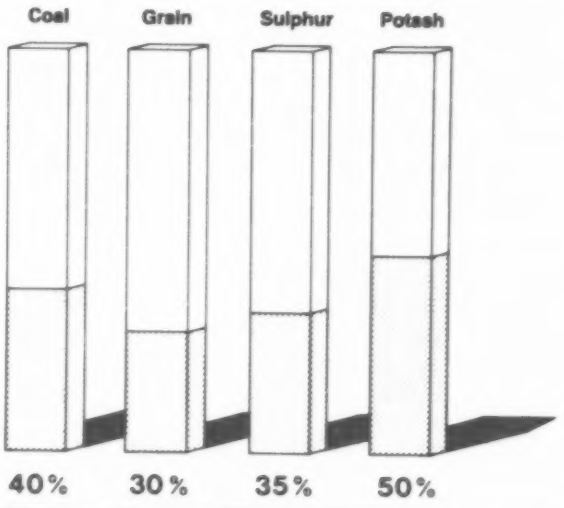
The first point is illustrated by Table 53, showing the percentages of transportation costs in the cost of four kinds of bulk goods.

The advantage, in principle, of using high or even very high-tonnage ships is obvious. In this respect, the St. Lawrence would make possible a sizeable reduction in the cost of bulk ocean transport. But the parties concerned must be made aware of this at the opportune moment, taking into account economic conditions or fluctuations in the markets.

The often precarious equilibrium between upbound and downbound shipments is also an important element in maritime economics, and perhaps more so on the St. Lawrence than elsewhere. There is no magic recipe in these matters, and no substitute for potential and

Table 53

Transportation Costs as a Percent of Delivered Cost for Selected Bulk Commodities in 1980



Source: Tom LAUGA, Swan Wooster Engineering Centre for Transportation Studies, University of British Columbia.

know-how combined. Thus it is essential to take constant advantage of a balanced rotation of the bulk goods traffic, which is heavy on the St. Lawrence. This applies not only to the practically "captive" traffic (e.g. that of iron ore toward the Lakes and that of grain from the West toward the Atlantic) but to all the other cargoes as well. There is competition in almost all these areas, and it is often very keen.

The export of grain and American coal overseas must not be neglected, any more than coastal transport related to bulk goods.

Let us now consider general cargo and containerization.

1.2.2 General and Containerized Cargo

Many kinds of ships' cargo cannot be handled as bulk. For a number of reasons — their fragility, shape, volume etc. — they do not lend themselves to handling by conveyor belt or to loading via closed conduits. Such goods are commonly grouped under one term: general cargo. They fall mainly into two categories: food products (fruits, vegetables, meat and fish) and the whole range of manufactured products (machines, tools, electrical appliances, medical supplies and an indefinite number of other products).

1 In *Seaports and the Shipping World*, (1963), Spring Issue.

While the handling of bulk goods was quickly mechanized and calls for little manpower, that of general cargo long required many hands to manipulate crates and sacks of all sizes and weights. To accelerate the loading and unloading of ships' cargos, seaports gradually acquired a variety of cranes, sometimes equipped with nets, sometimes with pallets, according to needs and human inventiveness. Thus the delays and risks of loading by hand were considerably reduced. Manpower costs, however, remained relatively high, and certain operations for safe stowage in the available space remained difficult or costly. Hence the rapid conversion in the 1960s to the system of containers of uniform shape and volume, thanks to which there was an increase in the speed and safety of the operations involved in loading or unloading, while certain forms of mechanization were introduced which helped to reduce costs.

On the North Atlantic, 34 container ships were already at sea in 1969. Of these, 60 % flew the American flag. Today, all the general cargo that is suitable for this kind of transport is containerized, or almost all. Even some bulk goods are shipped this way, for example asbestos; and all the major international trade routes are regularly served by container ships.

The consequences of these technical changes were manifold. Customers, whether shippers or importers, were by and large delighted with this new service which was so speedy, regular and relatively cheap; in addition, the user was better protected against theft and breakage. But now there was a new problem, that of small quantities of goods, insufficient to fill a container. For perishable products, soon there were containers with controlled temperature, henceforth an essential service for some customers. Then "door-to-door" service was developed, which considerably reduced administrative costs. All in all, an impressive improvement had been introduced.

For carriers and port authorities, this technical progress brought with it both advantages and constraints. Containerization facilitates the maximum utilization of ships and berthing capacity; and there is less chance that ships may be needlessly delayed in port. On the other hand, ports must make major capital investments. Warehousing must be provided, as well as transport linkages between ship, train and truck in the form of gantry cranes and other specialized and costly equipment.

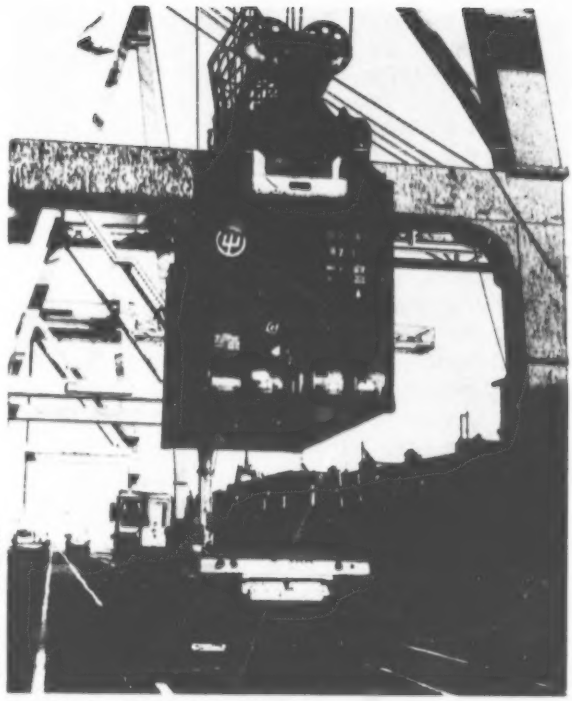


Photo: John Hutchinson

Containers have become the keystone of a complete, integrated transport system.

Improvements of this kind can only be justified by a sufficient volume of traffic, and inversely, a port cannot count on regularly receiving a large number of ships if it cannot ensure the efficient handling of an appropriate number of containers. If, in addition, a particular hinterland cannot keep a port busy with a sufficient number of containers (exported or imported), it will not be easy for that port to hold on to regular business with certain container ship companies. Also, if the movement of goods arriving and departing is too far out of balance, and the carrier, for example, has to leave with too many empty containers, the resulting low profit can become a stumbling block. These are the constraints to be taken into account if planning is to be careful and effective.

For dock workers, containerization means less parcel handling and sometimes greater problems of surplus manpower which have afflicted or are still afflicting solidly established ports the world over. Implementation of programs of voluntary severance with compensation has helped to solve a number of cases of surplus manpower in ports.

The east coast ports of the United States are subject to the 50-mile rule which forces shippers to use ILA stevedores to prepare their container shipments in plants within a 50-mile radius of a port. This rule is said to involve additional costs for the industries concerned; but it does not apply in Montréal, and this is believed to make Montréal's port more competitive.

Although there is still room for development and improvement in the containerization process, it is firmly established as one of the keystones in a complete and integrated intermodal transport system. Yet while cargo handling has become relatively fast and simple, including door-to-door service, the fact is that containerization calls for constant insistence on the full use of each mode of transportation within a given route. This balance is a hard one to maintain.

On land, theoretically, short distances should be covered by truck and long ones by rail. In practice it is not always so easy to plan the ways of reaching the port of loading or hauling cargo away from it. Unusual negotiations in a time of recession, and subsidies or grants of all kinds, can affect the cost ratios among the different modes of transport. It is impossible in our case to talk of rigid rules for carrying goods or containers to the ports of loading. On this subject, Mr. Robert J. Paterson, Vice-President of N.M. Paterson & Sons Limited, recently wrote to us as follows:

> However, when one looks at the massive inputs of public dollars into the rail system, one must consider all possibilities in a country with a rail mentality such as ours.

But let us pass on the container ports that concern us, and to their activities.

Container Ports

In eastern North America, the container transport picture is as follows. The ports of New York-New Jersey and Baltimore are the great entry and exit points for general cargo to and from the eastern United States. There, goods of all kinds, from every source and to every destination including the Far East, arrive and depart.

The ports of Halifax and St. John serve as special ports of call for Asian or European lines on their way to or from New York. These ports deal in goods destined for or coming from the Canadian Maritime Provinces, Québec, Ontario, and even the American North-East and Mid-west.[1]

Montréal, for its part, serves mainly as a link between Western Europe and Québec and Ontario, while 40 % of the traffic involves the United States.

In order to analyse trends in general cargo traffic in the main ports of Québec, it is useful to compare these ports with each other and with their main competitors: Halifax, Saint John, New York and Vancouver. For the purpose we will make use of recent information provided by Ports Canada in September, 1983.

The two ports in the Maritimes, Halifax and St. John, each year since 1976 have handled from 2 000 000 to 2 500 000 tonnes of general cargo. But one must point out an important difference between the two ports. In Halifax more than 70 % of the cargo is containerized, as against 40 % in St. John.

In Québec City the volumes reached 1 000 000 tonnes between 1971 and 1974, with a containerization level of 70 %. Beginning in 1978, when CP moved its container business to Montréal, the total volume of general cargo fell to 250 000 tonnes and the percentage of containerized goods dropped off sharply. In spite of this, the port of Québec experienced a large increase in the years that followed, mainly because of the shipping of lumber, which to some extent replaced the goods previously passing through Québec City.

In Montréal, the total volume of general cargo fluctuated considerably from year to year after 1970, but most often held between 3 000 000 and 3 500 000 tonnes until 1979, when it seemed permanently to break the barrier of 4 000 000 tonnes with the influx of the containers which had left Québec City the year before. It is interesting to note that the percentage of containerized general cargo rose to 60 % in 1978 and 70 % in 1980.

As for the port of Vancouver, it has handled between 7 and 8 million tonnes of general cargo per year since 1977, but only 12 to 15 % of this total is containerized. In New York, on the other hand, in 1980 and 1981, between 15 and 16 million tonnes of general cargo were handled, of which 11 million, or about 70 %, were containerized.

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1 See BROWN, M.G. and BROOKS, M.R. (1983), "Changing Hinterlands for Eastern Canadian Container Ports: 1978-1981", in *Proceedings of 18th Annual Meeting of Canadian Transportation Research Forum*.

Table 54

Containerized Traffic by Port, 1979-1983
(thousands of metric tonnes)

Port	1979	1980	1981	1982	1983
Halifax	2 082 (34.5 %)	1 936 (32.5 %)	1 786 (28.8 %)	1 419 (25.1 %)	1 510 (24.5 %)
St. John	898 (14.9 %)	964 (16.2 %)	904 (14.6 %)	987 (17.5 %)	910 (14.7 %)
Montréal[1]	3 051 (50.6 %)	3 058 (51.3 %)	3 501 (56.5 %)	3 233 (57.4 %)	3 753 (60.8 %)
Total	**6 031**	**5 958**	**6 193**	**5 642**	**6 173**

Source: Ports Canada.

1 In the first quarter of 1984, the port of Montréal recorded 1 019 533 tonnes. However, the recent (1982) announcement of Atlantic Container Lines' move to Halifax will no doubt cause a change in the figures for future years. It is difficult for the moment to foresee the precise effect of the change.

Table 55

Cross-border Container Traffic Between Canada and the United States, 1976-1983
(In twenty-foot equivalent units, TEU)

		A East Coast	B West Coast	C Total			G East Coast	H West Coast	I Total
Number of full containers unloaded in Canadian ports with destination U.S.A.	1976	27 615	271	27 886	Number of full containers unloaded in American ports with destination Canada	1976	27 911	28 468	56 300
	1977	47 298	2 338	49 636		1977	23 234	29 382	52 616
	1978	51 846	406	52 252		1978	21 743	33 203	54 947
	1979	56 433	239	56 672		1979	19 994	33 890	53 884
	1980	52 729	159	52 888		1980	18 538	38 335	56 873
	1981	68 871	602	69 473		1981	15 460	40 523	55 984
Canada ↓	1982	53 760	109	53 869	Canada ↑	1982	18 545	41 041	59 586
United States ↓	1983	69 824	1 024	70 848	United States ↑	1983	19 701	47 362	67 063

		D East Coast	E West Coast	F Total			J East Coast	K West Coast	L Total
Number of full containers unloaded in the U.S.A. and exported via Canadian ports	1976	22 324	1 155	23 479	Number of full containers unloaded in American ports with destination Canada	1976	20 921	6 636	27 557
	1977	32 391	1 357	33 748		1977	29 483	11 671	41 154
	1978	40 329	1 020	41 349		1978	23 806	15 561	39 368
	1979	47 923	908	48 831		1979	26 336	15 572	41 908
	1980	53 046	923	53 969		1980	26 338	18 270	44 608
	1981	57 134	1 085	58 219		1981	22 702	13 189	35 892
Canada →	1982	45 481	854	46 335	Canada →	1982	27 539	13 415	40 954
United States →	1983	50 945	557	51 502	United States →	1983	20 953	16 103	37 056

Cross-border Movements (TEU)

M = (A + D) − (G + J) East Coast		N = (B + E) − (H + K) West Coast		O = (C + F) − (I + L) Total	
1976	Canadian surplus 1 107	1976	Canadian deficit 33 679	1976	Canadian deficit 32 572
1977	Canadian surplus 26 971	1977	Canadian deficit 37 357	1977	Canadian deficit 10 386
1978	Canadian surplus 46 625	1978	Canadian deficit 47 338	1978	Canadian deficit 713
1979	Canadian surplus 58 026	1979	Canadian deficit 48 314	1979	Canadian surplus 9 711
1980	Canadian surplus 60 899	1980	Canadian deficit 55 523	1980	Canadian surplus 5 376
1981	Canadian surplus 87 842	1981	Canadian deficit 52 025	1981	Canadian surplus 35 817
1982	Canadian surplus 53 157	1982	Canadian deficit 53 493	1982	Canadian deficit 336
1983	Canadian surplus 80 115	1983	Canadian deficit 61 884	1983	Canadian surplus 18 231

Source: Compilation made using Ports Canada data.

In order to assess what the future may hold, it is interesting to take a closer look at the development of traffic in Montréal, Halifax and St. John since 1979, and the points of origin and destinations of the traffic in each port.

Table 54 shows at a glance that the total containerized volume for the three ports held at around 6 000 000 tonnes, though with a significant drop in 1982. The share of the port of Halifax fell slightly, to the benefit of St. John and, especially, of Montréal.

In the case of imports, 27.5 % of the containers unloaded in Montréal in 1981 were consigned to Québec, 21.6 % to Ontario, 10 % to New England and 32.9 % to the American Midwest. Of the containers delivered to St. John, 44.7 % were consigned to Québec and 38.4 % to Ontario. Of those delivered to Halifax, 33.3 % were consigned to Québec, 30.1 % to Ontario and 8.1 % to the Midwest.

The same phenomenon was observed in exports, in 1981. Of the containers exported from Montréal, 19.2 % came from Québec, 23.6 % from Ontario, 17.6 % from New England and 27.2 % from the American Midwest. In St. John, 33.1 % of the containers came from Québec, 31.3 % from Ontario and 7.7 % from New England. In Halifax, 28.3 % came from Québec, 29.6 % from Ontario, 9 % from New England and 9.5 % from the rest of the United States.[1]

To explain the remarkable share of Québec, Ontario and American traffic captured by the ports of St. John and Halifax, Mr. Rosaire Desgagnés, President of the Association des opérateurs de navires du Saint-Laurent, correctly remarked:

> We also know that the railways' objective is to "haul" their cars over the greatest possible distances. Thus it is in their interest, and not much more expensive for them, to "haul" from Halifax or St. John to Chicago rather than from the three main ports of the St. Lawrence.

But this is not all. A high percentage of containers coming from or going to Ontario and even Québec goes through the ports of Boston, New York and Baltimore. In this connection, a recent compilation by Ports Canada for the years 1976 to 1983 is revealing. It appears in Table 55.

As we can see, from 40 000 to 45 000 Canadian containers pass through the east-coast U.S. ports each year. The routing decisions seem to be made mainly by the carrier country, especially if it also happens to be the country of origin or destination of the cargo in question. In fact, we mentioned above that Asian lines, Japanese to be exact, were willing to call at St. John or Halifax on their way to or from New York. We mentioned this in connection with asbestos. Mediterranean lines do the same.

The behaviour of these lines would likely be different if the volumes intended for Québec or the interior of the continent justified regular service to Montréal. We can find an example in the lines that maintain direct service between Montréal and Antwerp or Rotterdam. Thanks to energetic marketing offering door-to-door service, these lines have put together a large clientele from Québec, Ontario and the American Midwest on the one hand, and from Western Europe on the other. Thus they are assured of a sufficient volume to justify regular service.

For some time now the American ports on the Atlantic, especially Baltimore, have been trying to oppose the movement of containers from the Great Lakes states via Montréal, referring to this movement as an "illegal diversion" by Canada. The shippers and importers themselves, however, have defended this route, considering it to be the most economical and efficient for their purposes. It might be considered to be merely the counterpart of the reverse "diversion" of 55 000 to 60 000 tonnes annually on the west coast. For the same reason one should mention also that 7 to 9 million tonnes of oil are "diverted" from the St. Lawrence by the Portland pipeline, and that a significant number of containers should be counted as American "diversion" on the east coast. But in this connection let us recall the 1984 study already quoted, by Faivre, Archambault and Kurasawa;[2] It contains an interesting analysis of the so-called "diversion" phenomena.

Whatever may be said about the varied faces of the competition, containers moving to the United States or coming from there make up 40 % to 50 % of the container volume handled in Montréal. It is thus extremely important to maintain those advantages that win preference for Montréal, and that ensure it of a sufficient volume to attract the maritime lines.

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1 According to BROWN and BROOKS, *op. cit.*

2 FAIVRE, ARCHAMBAULT and KURASAWA (1984), *Acheminement en territoire américain du commerce outre-mer canadien à l'exportation, Marchandises générales, Année 1981*, Canadian Transport Commission, DT 20-84-19, 106 pp.

When we speak of container traffic via Montréal, however, we must not forget the cooperation of the railway companies. A number of briefs received during the consultation carried out by the Task Force were very insistent on this point.

Mr. Jacques Côté, General Manager, Marketing and Sales, CP Rail, for example, noted:

> The success of the port of Montréal is due in large part to its geographical location, but also to the extensive cooperation of the Canadian railways in promoting the port; the marketing groups of both rail transporters try to outdo each other's ingenuity in perfecting the service offered to the hinterland, and thus contribute to increasing the traffic forwarded by these ports. CP Rail's sales offices in every large city in Canada, as well as in the big centres in the United States, Europe and the Far East, ensure world-wide coverage for the port of Montréal.

The remarks of Mr. J.D. Poirier, General Manager of sales for CN Rails overseas market, are somewhat similar:

> In our opinion, it is certain that the rapid strides made by the port of Montréal in the last fifteen years have their origin in a very elaborate network of container terminals served by rail, and that without that network the importance of the port of Montréal would not be what it is today.

These judicious remarks prompt us to become insistent in our turn: it is impossible to account for the economic situations affecting maritime transport, or to plan maritime transport activities, without continual contact with the managers of other modes of transport. And there are great advantages to be gained by encouraging them to be complementary.

The consultations and research work leading up to this report have, by the way, led to a preliminary analysis of a land bridge project between Vancouver and Montréal, in concert with the CN and CP. We would like to refer to it briefly here.

In order to attract to Montréal a large number of containers coming from the Pacific and destined for Europe or vice versa, we are looking into the question of whether a sustained working relationship between the ports of Montréal and Vancouver and the two great Canadian railway companies, accompanied by an appropriate marketing effort, would not make it possible to establish a land bridge advantageous to all partners.

The development of containerization is far from complete: there is room for a number of viable initiatives to be taken in certain cases. In other cases there are adjustments to be made. For example, the large maritime shipping lines are giving increasing thought to serving only one container superport on either side of the Atlantic. They are said to be considering New York and Rotterdam.

There is no doubt that such a step would change many practices. The new container ships are bigger and have a decidedly greater draught than the present ones. Should the shipping channel between Québec City and Montréal be deepened? Major constraints, both economic and ecological, would accrue. And what of the limitations on dredging imposed by the Lafontaine Tunnel alone! Or the necessity of moving Montréal's port facilities downstream!

In order to protect but also to develop Québec's shipping traffic, it might be appropriate, rather, to look at the possibility of Québec City's becoming a container port once more. This port, as is well known, could already accomodate the new container ships, as the depth in dock is 15.2 metres, and intermodal connections with the hinterland are excellent.

It would be far preferable to envisage this solution, in appearance detrimental to Montréal, rather than allow traffic to be rapidly diverted to the east coast of the continent. ACL's recent move to Halifax seems to reflect a growing concern.

As we see, the excellent position occupied by container traffic in Québec must be guarded with constant vigilance — another reason for encouraging intensified cooperation with those responsible for shipping traffic in the Great Lakes region. And we should mention that in the present economic situation it is important to ensure that subsidies or the fixing of special rates do not lead to dangerous distortions in the evolution of cost structures.

What is the situation, in Québec, with regard to non-containerized general cargo? Consisting largely of shipments of lumber, powdered milk and paper, this traffic warrants attention.

In Table 56 there is a summary of developments in this field between 1980 and 1983, in those Québec ports that are under the jurisdiction of the former National Harbours Board.

These data include shipments known as Project Cargo, carrying a variety of materials to Québec firms in developing countries, for example Tréco of Saint-Romuald, working in Algeria on the reconstruction of El Asnam. These exports leave the ports of Montréal and Québec City, in particular.

The heavy traffic of imported automobiles, primarily from Japan and France, eludes us. The ports of New York and Halifax drain it off. Yet what prevents us from eventually installing the necessary receiving platforms in certain Québec ports? And there is room for much development in the area of receiving spare parts, and that of the assembly of vehicles, appliances and machines of all kinds.

This survey of general cargo traffic, containerized or not, may have helped to bring out the variety of relationships that exist between maritime transport and the Québec economy as a whole, industry and trade. At the same time we have seen the beginnings of another kind of relationship with the economies, industries and business activities of Canada, the U.S.A., Europe, Asia, Africa — in short, the whole world.

There is ample material here to inspire Québec's maritime and economic strategies. That material can throw light on the relations to be maintained with, for example, the Great Lakes and Ontario fleets; it can, to give another example, provide a timely signal as to the need to keep a close eye on the movements of Ontario and Québec containers using east-coast ports; and it can also provide grounds for implementing new measures to bring about priority increases in the shipment of certain goods, or furnishing protection for others.

We cannot, however, begin to define at this time all the avenues of development, or even suggest an order of priority among them. Before attempting such an exercise, it is necessary to look into aspects of the St. Lawrence other than its potential as a trade route. Accordingly, we will conclude this section of the first part of our report, and deal with those concerning infrastructures and equipment, the parties involved, and the costs. Then, after a second part devoted to the exploitation of resources other than transportation, we will study these possible avenues of development.

Québec, as we have said, is a great maritime region in the Americas and in the world, just as it is the great maritime façade of Canada. The tonnage forwarded through Québec's ports constitutes a third of Canada's maritime traffic and 40 % of its international traffic. Moreover, Montréal is entitled to be called Canada's leading port for containerized goods. It seems clear that Montréal is actually confirming from year to year its role as a link between the Great Lakes area of the U.S.A. and western Europe. Finally, Québec City's port obviously has a unique place in the shipping world, and the activities of each of Québec's many other maritime ports contribute to a general aspect of openness and rich variety.

This vigour in the maritime sector creates thousands of direct jobs. Industry can thank it for reliably competitive maritime transport rates.

Table 56

Non-containerized General Cargo Handled in Québec Ports, 1980-1983
(in tonnes)

Port	1980	1981	1982	1983
Chicoutimi	—	—	—	59 432
Baie-des-Ha! Ha!	414 893	394 690	501 398	403 866
Québec	432 282	465 103	548 152	499 990
Trois-Rivières	217 824	215 525	197 883	187 576
Montréal	4 767 453	5 119 982	4 408 151	4 713 512
Sept-Îles	66 364	48 070	36 470	26 519

Source: National Harbours Board and Ports Canada.

The situation varies according to the goods and markets involved. Grain transport appears quite stable. That of iron ore is experiencing a slow recovery following a decline in steel production on the Great Lakes. Exports of American grain and coal run into competition from the shipping rates on the Mississippi and its tributaries. As for container markets, despite their strong growth they are still areas of tough competition.

In short, the healthy situation of ports and shipping cannot be taken for granted indefinitely. As we have noted, great vigilance is called for; steps should even be taken to stimulate the activity. In this connection, it would be desirable to gather the pertinent information, and for more than one sector at a time, given the reciprocal inflows among many kinds of maritime transport.

The Montréal Corporation for Port Promotion is not inattentive to this aspect, as it wrote to the Task Force as follows:

> Further to our discussion on the usefulness of calling on many more sources of information as to the kinds of goods that are accessible for transport via the St. Lawrence Seaway, the Projet Saint-Laurent could, for a start, instigate the creation of a coordination centre for such information, and consider the eventual establishment of a kind of Exchange, a meeting-place for supply and demand, for cargoes to be shipped, and shipping available to carry them, via the St. Lawrence route.

We agree, because it seems to us that geographical advantages do not automatically turn into economic ones, nor are economic advantages necessarily stable. Quite the contrary.

Efficiency dictates both strategies and means, all the more so if it is to be increased. So far as shipping on the St. Lawrence is concerned, a concerted effort is called for, not only in the field of information but in those of promotion and projects. If such an effort is made, the St. Lawrence will indeed live up to its natural advantages, and Québec will bear witness to its great maritime potential.

1.3 Infrastructures and Equipment

As we dealt with traffic it was inevitable that we should refer to the main infrastructures and equipment, i.e. the ships, the canals and locks, the shipyards and the ports. Moreover, we have no intention of going into detailed or minute descriptions, even of the main facilities. The question that justifies our dealing with these in a separate section of this report is the following: are the present infrastructures and equipment adequate to meet foreseeable needs?

We often asked this question during our consultations. All those whom we asked tried to support their replies by calling upon experience acquired, a few compiled data, or reasonable forecasts. We were forced to conclude that their replies varied according to individual criteria and sometimes the position of our interviewee, though we were not always able to get a precise idea of the criteria behind their answers.

We must, then, admit that the question is a broad and complex one, and cannot be dealt with by demonstrations buttressed by data or estimates or calculations. It is up to us now to try to gather together the converging lines in the replies we received, which rest more on judgment and experience than on unassailable reasoning.

1.3.1 The Ships

Port authorities on the Great Lakes deplore the small number of ocean-going vessels that serve their ports with general cargo. The opening of the Seaway in 1959, with its eight-metre deep locks, had aroused great expectations. They had hoped to be managing America's Fourth Seacoast. At last the industrial complexes of the American Midwest had their seaports!

During the decade that followed, one indeed saw an increase in the number of ocean-going ships plying between the River and the Great Lakes. They were, of course, low-tonnage ships. With the arrival of bulkers and container ships of more imposing dimensions it was increasingly necessary to have recourse to transhipment in order to serve the Great Lakes and the industries in that region. Thus the classic chain became established: ocean transport as far as a port on the St. Lawrence, in the Maritime provinces or the east coast of the United States; then transport to the interior by laker, train or truck.

The big ocean freighters of today often have a draught of twelve metres or more; and periodically the idea is revived of again deepening the channel between Québec and Lake Superior. However, because of the astronomical cost of such a project, its inevitable environmental impact, and the at least temporary decline to which the St. Lawrence ports would be doomed (temporary for how long?), very few people are prepared to promote the investment seriously. As long as there is no glimmer of the overall advantages nor a prospect of equitable sharing of the certain benefits, nor yet the likelihood of appropriate control of undesirable side-effects, it would be unwise to count on such a transformation of present facilities and equipment.

For their part, the American port authorities around the Great Lakes are still trying to set up a new system of feeders to transport containers from their ports to Montréal, now that Manchester Liners no longer operate upstream from this port. But here again, the closing of the Seaway in winter does not encourage such a service, and rail and road carriers would be little tempted to act as winter replacements for this kind of traffic. This concern is well reflected in a letter we recently received from Mr. Jacques Côté, General Manager, Marketing and Sales, at CP Rail:

> The concept of a Feeder Service during the shipping season on the Saint Lawrence Seaway will have to be studied seriously, especially with regard to its impact on the competitive position of the rail carriers and their ability to go on offering a service to the American Midwest at very attractive prices. Neither CP nor CN could in fact ensure a rapid rail connection with the Midwest or even justify the purchase of the equipment needed to serve this market for the three winter months alone. We feel that before undertaking to support this concept of a Feeder Service, the Québec government

Between 1970 and 1983, the number of self-unloading ships rose from 73 to 104. These represent 46% of the inland fleet on the St. Lawrence/Great Lakes system. *Photo: John Hutchinson*

should look more deeply into its repercussions on the railway industry in Québec and on the port of Montréal, by evaluating the relative contribution of the rail alternative versus that of the Feeder Service in terms of jobs and other benefits to the economy of the Province. This study should also weigh the consequences of the difficulty for the port of Montréal of offering a quality service to its Midwestern customers for three months of the year if the Feeder Service concept is adopted.

In any case, present users seem very satisfied with the intermodal container transport service to the port of Montréal. It has already passed the mark of 400 000 TEU (20-foot equivalent units) per year. And if this progress continues it will even be necessary to enlarge the container docks.

We should note another interesting development touching a good part of the St. Lawrence and Great Lakes fleets. Since 1970, in fact, there has been an almost regular decrease in the number of bulk carriers. Between 1970 and 1983 their number dropped from 267 to 125. At the same time the number of self-unloading ships increased with almost equal regularity, rising during the same years from 73 to 104.

The numbers of the two types of ship were very different in 1970 (73 self-unloaders and 267 bulkers); in 1983 there was almost the same number of each (104 self-unloaders and 124 bulkers), as Table 57 shows.

This development illustrates a direction being taken by technological innovation from which one might expect extensive repercussions on port facilities, if they were to choose (or were more or less forced by the demand) to match the loading or unloading speed of self-unloading ship. It is estimated that one of these can off-load a bulk-grain cargo at a rate of 6 000 tonnes per hour, if land facilities permit.

According to the Canadian Transport Commission, there were 13 shipping companies registered in Québec at the beginning of the 1980s. At the time those companies owned 75 ships with a total gross tonnage of 811 004, and a dead weight tonnage of 1 193 140. That is to say, these ships accounted for 72.2 % of Canada's gross tonnage and 37.5 % of its dead weight tonnage.

The main companies having their head office in Québec are Canada Steamship Lines, now le Groupe CSL, with 33 ships, and the Halco Company Inc., with 17 ships. These two thus make up two-thirds of the total.

About a third of the marine transport licence holders were engaged in coastal traffic.

Finally, Table 58 shows the composition of the Great Lakes fleet in 1981, keeping separate account, in the Canadian figures, of the number of ships belonging to companies having their head office for maritime operations in Québec.

One could, of course, add many other data, particularly on the use made of the St. Lawrence by foreign ships or those flying flags of convenience, and go into much deeper analysis; but no good comprehensive study on these matters is as yet available. Indeed, we would like to undertake this task, or see it undertaken, as it would be most useful.

1.3.2 The Seaway

Users or interested parties, from the Lakehead to the Gulf of St. Lawrence, agree in their wish to see the development of a laker shuttle between the Lakes and the ports of the St. Lawrence; but there is a fear that this venture might be progressively and seriously handicapped by the short shipping season or by a bottleneck in the Welland Canal. Winter navigation on the Great Lakes and in the Seaway are at the heart of this debate. The subject has, for that matter, been discussed ever since the opening of the Seaway in 1959, before regular winter navigation to Montréal began, bringing traffic to the threshold of the Seaway.

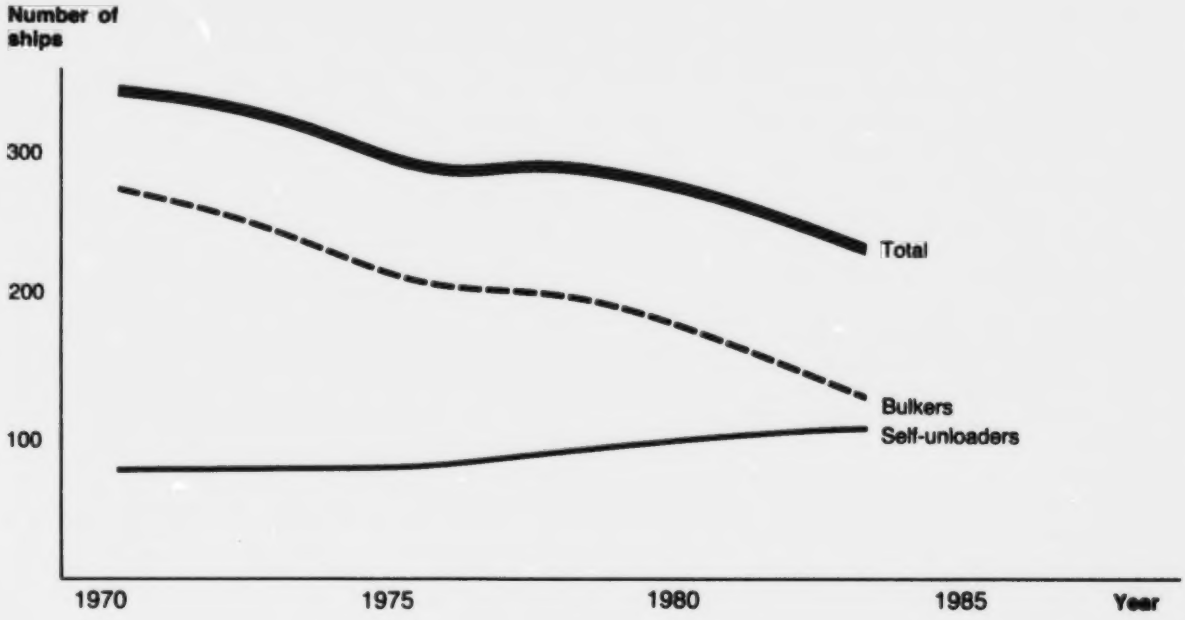
Some Americans keep returning to the subject periodically. As late as 1979 it was recommended, following a study by the U.S. Army Corps of Engineers, that the shipping period should be gradually extended. It was hoped it would go from eight months to ten by 1995. In the summer of 1983 an American congressman brought the question up again, supporting the 1979 recommendations.

Critical voices, however, have not been lacking, and Canada believes its interests would not be served by investing heavily in such a project. The criticism has centred — and still does — on a number of the project's aspects: the cost-benefit ratios, the effects on the environment, and the consequences for the

Table 57

Change in Numbers of Bulkers and Self-unloaders (Can. & U.S.) on the Great Lakes/St. Lawrence System

	Self-unloaders		Bulkers		Total
1970	73	(21 %)	267	(79 %)	340
1975	79	(28 %)	208	(72 %)	287
1977	84	(29 %)	203	(71 %)	287
1981	100	(38 %)	160	(62 %)	260
1983	104	(46 %)	124	(54 %)	228



Sources: — *Greenwood's Guide to Great Lakes Shipping* (1970, 1975, 1977, 1981).
— *Dominion Marine Association*, 1983 Annual Report.
— *Lake Carriers' Association*, 1983 Annual Report.

Table 58

The Great Lakes Fleet (1981)

	Québec[1] Canada						United States					
Tonnage	Less than 5 000	5 000 to 10 000	10 000 to 20 000	20 000 to 29 000	29 000 and over	Total	Less than 5 000	5 000 to 10 000	10 000 to 20 000	20 000 to 29 000	29 000 and over	Total
Categories of Ship												
Bulkers	(2) 3	(7) 11	(10) 25	(9) 37	(6) 8	(34) 84	9	5	46	14	2	76
Self-unloaders	(—) 2	—	(3) 8	(3) 9	(8) 19	(14) 38	2	—	23	15	22	62
Tankers	(—) 2	(7) 14	(11) 10	(—) 1	—	(18) 35	3	4	—	—	6	13
Package freighters	(—) 2	(6) 6	—	—	—	(6) 8	18	—	—	—	—	18
Total	**(2) 9**	**(20) 31**	**(24) 51**	**(12) 47**	**(14) 27**	**(72) 65**	**32**	**9**	**69**	**29**	**30**	**169**

Source: Greenwood's Guide to Great Lakes Shipping (1981), Freshwater Press, Inc., Cleveland Ohio.

1 Only the fleet of companies which are carriers in the St. Lawrence/Great Lakes system, and whose head office for shipping operations is in Québec.

production of hydroelectric power, whose installations were the origin of many developments on the St-Lawrence. Canada's attitude proceeds from the fact that this country is responsible for the eight locks in the Welland Canal and five of the seven locks between Lake Ontario and Montréal.

After consultation with Québec and Ontario, Canada made its position known to the United States, emphasizing the need to analyse the environmental impact and all the other consequences noted above.

Some American carriers also hesitate to endorse the project, or at least show little enthusiasm for it, fearing that a central authority in favour of toll charges might in the end oblige users to pay for a large part of the undertaking. They know that thawing the ice in the locks and the operation of ice-breakers on the Great Lakes would involve considerable costs.

Canadian members of the Seaway Authority advocate other immediate measures, especially a more efficient use of the present facilities. It has been noted that the locks are teeming with traffic at the opening and closing of the shipping season, while this activity falls off noticeably in mid-season. One wonders if there would not be advantages in a better use of the season, perhaps by means of warehousing more cargo in the St. Lawrence ports for shipping overseas during the winter.

Among other useful steps, without proposing them as panaceas, we might mention a gradual increase in the average size of ships up to the maximum tolerance of the present locks, and an effort toward achieving a better balance between upbound and downbound traffic. However, we must not harbour any illusions about the latter. It is true that, because of the restricted demand for iron ore, half the lakers make the return trip empty. But this situation could grow even worse if there were a recovery in coal exports, as this increase would add to downbound grain traffic, and thus to the costs related to the imbalance. As far as the size of ships is concerned, quite a number of individual requirements will continue to call for smaller ships (the limited capacity of certain ports, for example, and, of course, special cargoes). In many cases the use of strings of barges might compensate to some extent, or so we heard during our consultations. But, as we know, barges are practically unheard of on the St. Lawrence, with a few exceptions in the transport of pulpwood. The reason is simple: the system is not profitable.

Another measure that could improve the performance of the Seaway facilities: planning ships' movements by computer. We have enough examples of the benefits of timely recourse to computers; and we should not neglect its possible contribution.

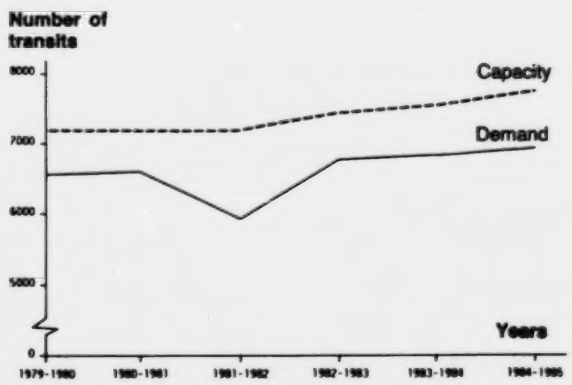
The general economic situation may well discourage ship owners from replacement of their fleets. Yet this must be prepared for if maximum benefit is to be derived from it.

In the next ten or fifteen years, the day will come when congestion of the Welland Canal might affect the whole system. To become fully aware of this we need only look at Table 59, showing the development of demand and capacity in this section of the Seaway.

Because each year some 10 million tonnes more are forwarded through the Welland Canal than through the Montréal-Lake Ontario section, it is easy to foresee a progressive overcrowding of the Canal, despite the introduction of various measures designed to alleviate the constraints. However, a closer look tells us that the yearly increase is confined almost exclusively to the downstream traffic, and is largely (75 % to 80 %) due to the shipment of coal from the American ports on Lake Erie to the Hamilton-Toronto-Oshawa area. This is quite a short

Table 59

Welland Canal Transit Capacity and Demand



Source: Transport Canada,
1983-1984, Estimates
Part III, Expenditure, Plan pp. 3-49.

distance, which suggests a practical and relatively cheap solution: free the Canal for use by traffic between the Lakehead and the St. Lawrence ports, perhaps by shipping the coal in question via unit trains. This could prove to be an indirect solution to the Welland Canal's capacity problem.

In any event, it will probably not be possible indefinitely to prevent the Seaway from becoming congested. All the forecasts suggest it. One can also refer, in this connection, to Table 60, a composite chart from the Seaway authority. The chart is based on the following studies:

— KATES, J. and Associates (1965), *Seaway Tolls, Analysis and Recommendations*, prepared for the St. Lawrence Seaway Authority, Toronto.

— D.W.M. CARR & ASSOCIATES LTD (1970), *The Seaway in Canadian Transportation: an Economic Analysis*, 2 vols. The St. Lawrence Seaway Authority, Ottawa; Vol. 1, 305 pp.; Vol. 2, 299 pp.

— L.B.A. Consulting Partners Limited (1978), *The Seaway in Winter: a Benefit-Cost Study*, The St. Lawrence Seaway Authority, Ottawa, 153 pp.

— Ontario Great Lakes/Seaway Task Force (1981), *The Great Lakes/Seaway: Setting a Course for the '80s*, Government of Ontario, 88 pp.

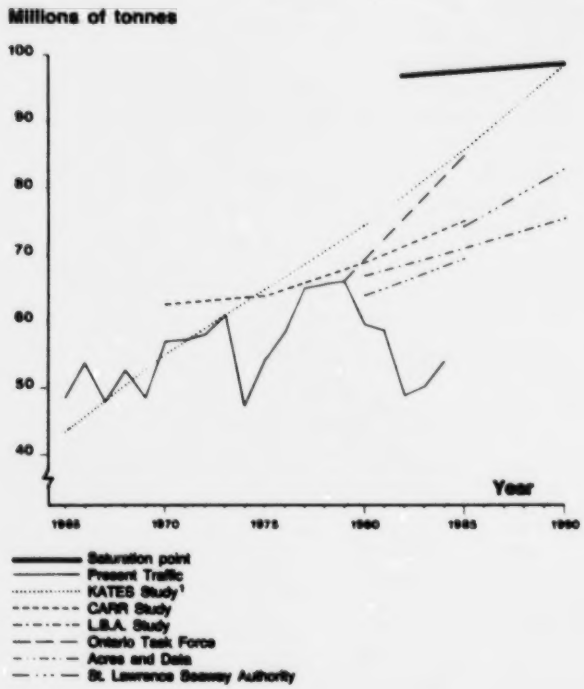
— Acres Consulting Services Limited, Data Resources Inc. (1982), *Seaway Commodity Flow Forecast 1980 to 2000*, 664 pp.

— Canadian Transportation Research Forum (1982), *How is it that the Welland Canal Continues to Meet Increasing Tonnage Demand?* The St. Lawrence Seaway Authority, Operational Planning Division, pp. 11-26.

The situation in the Montréal-Lake Ontario section is not at all comparable with that of the Welland Canal. This will be seen in Table 61.

Table 60

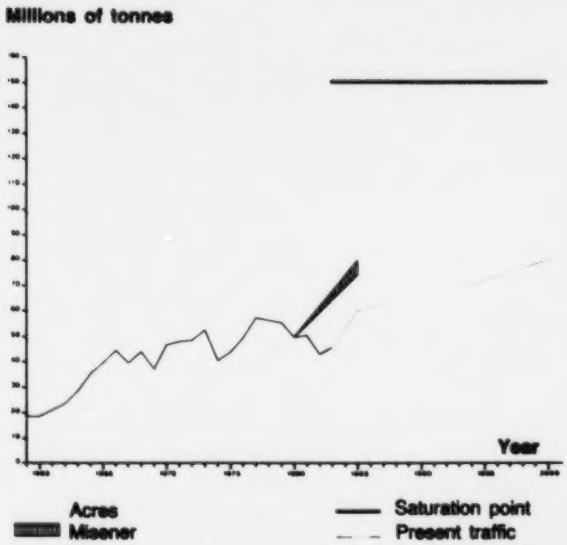
Present Traffic on the Welland Canal and Forecasts



1 This study deals with the average forecasts for total Seaway Traffic not just the traffic on the Welland Canal section.

Table 61

Development of Commodity Traffic and Forecasts for the Seaway in the Montréal-Lake Ontario Section, 1959-2000



Sources: — Seaway Authority (1981).
— Misener: *the Great Lakes/Seaway: Setting a Course for the '80s*. Report of the Provincial Great Lakes/Seaway Task Force, Toronto.
— Acres Consulting Services Limited and Data Resources Ltd., *Seaway Commodity Flow Forecast 1980 to 2000, February 1982.*

1.3.3 The Shipyards

Some thirty companies specialize in shipbuilding and ship repair in Québec. Of these, eight have built ships of over 100 tons. Three are members of the Canadian Shipbuilders' Association and carry on 80 % of the activity in Québec. All three are among the largest Canadian shipyards. They are Marine Industries, in Sorel, Davie in Lauzon, now known as Versatile Davie Inc., and Versatile Vickers in Montréal. The latter is involved only in ship repair.

These three shipyards take care of a good part of maintenance for the fleet operating on the St. Lawrence and the Great Lakes, many of whose ships were, by the way, built in the two shipyards carrying out construction work.

The last fifteen years have been difficult for Québec's shipyards, as reflected in the decreasing number of their employees:

	1978	1983
Marine Industries Limited	3 640	1 100
Versatile Vickers	1 705	700
Versatile Davie Inc.	1 728	550
Les industries A.C. Davie inc.	20	10
Lévis	80	0
Total	**7 173**	**2 360**

The activity is heavily dependent on government contracts, especially from the military, and is obviously affected by an economic situation in which it is difficult to use existing fleets to the full. In certain cases the adaptation or even the conversion to heavy machinery (turbines, drilling platforms etc.) can succeed in bringing about the stability of a shipyard fairly quickly, but in the majority of yards it is far from easy to maintain a steady level of employment. This is an area in which the demand is often erratic, and the competition keen, particularly international competition.

1.3.4 Port Facilities

As regards the storage of bulk goods, in particular grain elevators and warehousing for dry bulk, Québec's port installations are not yet used to the full. In the case of grain elevators, Table 62 shows their static capacity and their turnover rate for 1982.

The performances of the Québec and Port-Cartier facilities stand out remarkably, and all the more so as Québec's performance was recorded before new installations were put into service for self-unloading freight cars and ships. However, in interpreting Table 62, we must in a number of cases take into account certain parameters that reduce the rate of yield. Thus, in Montréal, the distribution of locally consumed grain involves using a portion of the static capacity. In Baie-Comeau and Port-Cartier, whose ports are not directly linked to the railway, the supply process is interrupted by the winter closing of the Seaway upstream from Montréal. But we are less interested by details here than by the realization that at first sight the elevators seem likely to be sufficient in number for some time to come.

Table 62

Distribution of Metric Capacity of Grain Elevators in the Ports of the St. Lawrence, and Grain Traffic in 1982

Ports	Static Capacity* (in tonnes)	% of Capacity	Grain Exports in 1982			Annual Rate of Turnover
			Canadian Grain	American Grain	Total	
Montréal	656 880	33.5	2 643 673	179 779	2 823 452	4.3
Sorel	146 460	7.5	942 402	9 176	951 578	6.5
Trois-Rivières	167 380	8.6	516 766	158 882	675 648	4.0
Québec	224 030	11.4	4 687 750	212 517	4 900 267	21.9
Baie-Comeau	469 840	24.0	2 217 690	1 245 071	3 462 761	7.4
Port-Cartier	292 980	15.0	2 779 694	1 854 569	4 634 263	15.8
Total	**1 957 570**	**100.0**	**13 787 975**	**3 659 994**	**17 447 969**	**8.9**

Source: Canadian Grain Commission and Ports Canada.

* Static capacity is the volume of grain the elevator can hold, as distinct from the dynamic capacity, which takes into account the efficiency of use of the elevator. To obtain the annual rate of turnover, we divide its annual tonnage by its static capacity.

Moreover, in order to take care of an increasing number of bulk transhipments, construction has already begun on expansion projects at the port of Québec City, and on a very large project at Pointe-Noire (Sept-Îles). Other projects are under way in Chicoutimi (Grande-Anse), at Bécancour (aluminum plant), at Valleyfield and at Contrecoeur.

It is a different story when we come to container handling in Montréal. An extension of the port has had to be considered, but there are divergent views on the subject.

Some suggest expanding in the direction of Île Sainte-Thérèse, downstream from the Louis-Hippolyte Lafontaine tunnel. In this way the port would develop in continuity, remain on the Montréal side, and still be served by the two Canadian railway companies. On the other hand, it would be necessary to build bridges to serve Île Sainte-Thérèse. What is more, that island is at present reserved as a green space.

A recent study commissioned by the Montréal port authorities' proposes eventually moving the container port to the South Shore, near Contrecoeur. Many objections have been raised against this proposal. The site is now accessible to only one of the two railway companies, and their may be conflict with agricultural zoning. On this subject, Mr. Jacques Côté of CP Rail notes:

> Any expansion of the port facilities in either Montréal or Québec City must guarantee access by the two national railway carriers to the new operating areas. This is an essential prerequisite to ensuring that these ports are competitive, and in this connection we are extremely disturbed by rumours about some future expansion of the port of Montréal into an area that is inaccessible to our railway system, as recently announced in the newspapers. Such a decision would obviously be detrimental to CP Rail, but above all it would be a serious threat to the competitive position of the port.

At a meeting of the Montréal Corporation for Port Promotion (composed of members of the Chamber of Commerce and of the Board of Trade), the Montréal business community was flatly opposed to the recommendations put forward by Les Consultants Dessau. The Société, through its president, Maître Raynold Langlois, expressed certain reservations about the value of the results obtained by this study:

— It considers it to be a false assumption that space on the Island of Montréal is 100% occupied (the prime reason given for relocating certain activities).

— The Dessau report seems to have dismissed the possibility that the port of Montréal might be allocated additional space on the island of Montréal.

— The potential sites on Île Sainte-Thérèse and Île de Verchères were eliminated because of the additional infrastructural requirements they presupposed (bridges, etc.). This remark is true, but they seem to have forgotten to take into account the cost involved in developing an appendage to the port 60 kilometres from its present location. This cost appears to be all the higher because the proposed locations are on the South Shore of the River.

— It seems reasonable to ask whether the transfer to Contrecoeur (the site preferred for the technical and operational aspects of certain activities) would not result in creating a port that competes with the present port of Montréal, rather than promoting better exploitation of the River's potential.

It is therefore appropriate to take a closer look at the future of the port of Montréal and orient its development in terms of its users and the major land use plans, remembering that the Québec government favours Montréal island as the site of expansion.

In any case, Québec needs port facilities to satisfy the needs of its own industry and trade. At this time, the existing facilities, which consist of the national harbours, federal docks, fishing ports, the port of Valleyfield, the port of Bécancour and the private facilities in the ports of Sept-Îles, Pointe-Noire, La Baie, Port Cartier, Baie-Comeau, etc., satisfy needs relatively well but could be improved if necessary. In most cases, there is no space problem. What is important is to be able to forecast future needs in time to be able to meet them.

To complete the review of ports and port facilities, it should be pointed out that the Government of Canada is in the process of revising its whole policy on the subject of the docks, small ports and harbours under its jurisdiction

1 Les Consultants Dessau Inc. (1982), *Étude du port de Montréal*. Written in collaboration with Langlois, Lavoie, Huot et associés, and Carr and Donald Associates Ltd., 156 pp.

Photo: John Hutchinson

With a planned extension of the port of Montréal to facilitate container movements, a number of solutions are possible.

on the St. Lawrence and around the gulf.[1] The objective is to clarify the role and importance of each site with respect to the needs of the regions involved. Afterwards, certain selected docks will be restored and maintained, while others will be transferred or simply abandoned.

Québec must therefore clearly spell out its needs for these docks, whether they be to supply isolated communities, provide services to fishermen, ship natural resources, ensure the safety of pleasure craft or provide ferry services.

On the whole, Québec's port facilities appear to be adequate to face the increase in traffic predicted in the short and medium term. Whether for bulk commodities or general and containerized cargo, all essential elements are in place. Each year has brought improvements in the installations themselves or in associated services such as fire protection, emergency services, dredging, setting of buoys, etc. Expansion is possible, and where necessary, rapid or temporary adaptations as well as permanent facilities could be completed. We have not discussed fishing here because it will be dealt with in a more appropriate section.

It might be useful, however, to look at a more detailed analysis of a number of related questions, such as jurisdictions, private or government property, recourse to foreign fleets and the use of ships under flags of convenience.

In any case, attention must be paid to the large number of parties involved in maritime trade and navigation. This number reflects the multiple, complex and often very specialized functions which require joint action that is as flexible as it is effective. We will turn to this aspect now, less in order to propose further streamlining than to explain the advantage of developing a general view on this subject.

1 BEAUCHEMIN, BEATON and LAPOINTE et al., (1982), *Master Plan Study of the Lower St. Lawrence Ports*, prepared for the Canadian Marine Transportation Administration, Ports and Harbours.

1.4 The Parties Involved

At first sight, maritime commercial activity appears relatively simple: the movement of goods from the producer to the consumer by ship.

But it is well known that this apparent simplicity requires a number of institutions concerned with both the commercial activity itself (intermediaries, agencies), and the conditions in which the activities take place (labour agreements, economic constraints, trade between different countries, consultation with industries or companies not really maritime as such), as well as public institutions and their laws and regulations. And at the heart of all this is knowledge, innovation, finance, manpower and everything which controls these aspects of economic activity and maritime trade. Taxes, exchange rates, advertising and information, insurance, law: ultimately, nothing is totally excluded. Nevertheless, the multiplicity of factors does not in itself justify avoiding the effort to obtain a consistent overview of the situation. On the contrary, its very complexity provides the best grounds for examining the larger units.

The first groups we will discuss are the merchants and carriers. Then we will look at the governments and the agencies that report to them or are associated with them in some way. Finally, we will look at specialized manpower: crews, pilots and insurers, and related to these groups, the freight forwarders and multinationals.

1.4.1 Merchants

Merchants, importers and exporters, play a prime role in the growth and development of a transportation system. The links they establish between producers and clients to a certain extent define some of the main parameters for transport, in this case maritime transport. Indeed, it is better to discuss them not just in general but in terms of particular kinds of freight. We will look at three examples for the purposes of this report: grain, iron ore and coal.

Grain

The leading grain producers are concentrated in the three Canadian prairie provinces and the western and midwestern United States. Canadians produce mostly wheat, coarse grains and some oil seeds. Americans also

grow a very large volume of corn, with soybeans and sunflowers occupying an increasingly large place among the oil seeds.

On the world scene, the grain market is heavily influenced by five big traders: Cargill (United States), Bunge (Argentina and the Netherlands), Louis Dreyfus (France), Continental (France and the United States) and André (Switzerland), plus Exportkhleb, the Soviet government agency. In most countries, producers or associations of producers deal with these traders for the international grain trade.

In Canada, marketing western grain involves a combination of two approaches: central (public) and open (private). It operates in the following way.

Wheat, oats and barley from the west for sale on foreign markets or for human consumption in Canada are marketed through the Canadian Wheat Board. On the other hand, wheat, oats and barley intended for the domestic animal feed market can be sold either through the Board or the private sector. Other western grains, such as rye, linseed and rapeseed, are marketed only by the private sector. Overall sales by the Wheat Board account for about 80 % of exported grain. Through its regulations, the Wheat Board controls the movement of grain from the farm gate to the regional elevator, as well as the shipment of this grain to terminals for export or processing.

The elevators, both regional and terminal, are owned by large private traders or Wheat Pools established in each western province by the growers. In both cases, these agencies act as agents of the Wheat Board for the purchase of grain at rural elevators and the handling of the grain at the terminals, as well as serving as sales agents for the Wheat Board. For the other grain and feed crops intended for Canadian markets, the Wheat Pools act as free marketing agents for their members. The prices paid are set by term transactions on the Winnipeg Commodity Exchange.

Another agency, the Canadian Grain Commission, is responsible for inspecting and controlling the quality of grains, weighing them and providing statistical data on the movement of grain in licensed elevators all across Canada.

Finally, a crown corporation called Canagrex was established in 1983 "for the purposes of promoting, facilitating and... engaging in the export of agricultural products and services and food products and services from Canada to other countries."[1] It may "purchase agricultural products and food products and package, process, ship, insure, import, export or sell or otherwise dispose of products purchased by it," promote and market Canadian products abroad in collaboration with Canadian companies and conclude sales contracts with foreign countries. Canagrex is, however, required to comply with requests by the Canadian Wheat Board for trade in "wheat, oats or barley or any wheat product as defined in subsection 2(1) of the Canadian Wheat Board Act or any oats or barley product as defined in subsection 35(4) of that Act." The corporation can also make or guarantee loans promoting exports.

As is apparent, there are many parties involved. And from the outset this means there is a major problem obtaining consensus on orientation and activities by the parties.

The two transcontinental railway companies, Canadian Pacific and Canadian National, transport the major portion of Canadian grain from rural silos to port silos. There are now some 25 000 rail cars allocated to grain transport, including 14 000 hopper cars provided by the Government of Canada, the Wheat Board and the provinces of Saskatchewan and Alberta.

There are nineteen terminal silos in Canada, with a static capacity of 3.7 million tonnes. Six of them are on the west coast, one in Churchill and twelve at Thunder Bay.

From Thunder Bay, approximately 75 % of the grain is carried by laker to the transhipment silos on the St. Lawrence, at Montréal, Sorel, Trois-Rivières, Québec City, Baie-Comeau and Port-Cartier, and then most is exported overseas. Another portion is loaded directly on small ocean-going ships, generally from the eastern European countries, at Thunder Bay. Finally, the Québec domestic market is also supplied by train from Thunder Bay or directly from the Prairies. Québec purchases are made by feed mills and agricultural cooperatives.

In 1979, Transport Canada established the Grain Transport Administration to coordinate the activities of the Canadian Wheat Board,

1 C-12.5, "Canagrex Act", given royal assent on June 29, 1983, p. 9. The corporation was officially created on January 3, 1984. Recent political statements suggest, however, that it may be abolished.

exporting companies, handling companies, railways, shipping companies — in other words, of all those ultimately concerned in the movement of grain from the Prairies to the ports.

Four federal departments are mainly involved: Transport, Industry, Trade and Commerce, Agriculture and External Affairs. In the latter case, it is more specifically an agency, CIDA, (Canadian International Development Agency) which is a major purchaser of Canadian grain for distribution to less developed countries. The Canadian Grain Commission and the Canadian Livestock Feed Board report to Agriculture Canada. The Livestock Feed Board of Canada was created to attend to the interests of livestock producers in eastern Canada and British Columbia. Its main objectives are to ensure availability, sufficient storage space and grain price stability for feeds in eastern Canada and British Columbia.

The key agency in the marketing of grain in Canada remains the Canadian Wheat Board, which is financed directly by the grain growers but reports to the Parliament of Canada through a specially designated minister.

Grains not under the jurisdiction of the Wheat Board are traded on the Winnipeg Commodity Exchange, a private institution which provides the facilities for buying and selling grain like securities on a stock exchange.

In the United States, most grain is traded on the Chicago Commodity Exchange. Exports to eastern countries are occasionally subject to vetoes by the American government. However, the major international traders often succeed in getting around such obstacles by detouring shipments away from their original destination.

In any case, the Canadian system deserves some attention, because it is not simple, to say the least. We will look at it briefly, explaining in Table 63 the main activities of the many agencies involved.

Iron Ore

Shipping this commodity is much less complicated than shipping grain, since the producers are directly in charge of trade in their products.

In the case of iron ore, there are five Québec-Labrador producers: IOC, Québec-Cartier, Mines Wabush, Sidbec-Normines and QIT-Fer et Titane. Four of these are controlled by American or Ontario companies while Sidbec-Normines belongs to Sidbec and British Steel.

All the major North American steelmakers, as well as British Steel, figure among the shareholders, all are experiencing problems with their steel mills, and all have holding in American mines in the Mesabi Range. Some have also invested in mines overseas, in Brazil for example. According to their spokesmen in Louisville in February 1984, all want to use North American ore first, before importing ore from elsewhere.

Coal

Coal producers number in the hundreds. Furthermore, their powerful lobbying group in the United States, the National Coal Association, promotes the use and export of coal.

At this time, the Association believes the railways are asking unreasonable prices for transporting coal. According to the group, these prices make coal producers uncompetitive on the world market. The Association also says it has problems from the anti-pollution measures intended to reduce acid rain.

We have looked at these examples because they account for a major portion of the traffic on the St. Lawrence. But structures for marketing these products are almost as numerous as the products themselves. What is important to notice is that maritime transport is significant enough in these industries for them to be considered in any trade negotiations. While ways of doing this are diverse, promoting communication among producers, dealers and carriers can only help consolidate the status of St. Lawrence shipping.

1.4.2 Carriers

Obviously there are many carriers: trucking firms, railways and steamship lines, both inland and ocean-going.

In the case of trucking firms, many companies compete with regard to rates and territories. They need provincial, interprovincial and inter-state permits controlled by commissions. However, with deregulation, it is becoming easier for customers to negotiate rates and obtain advantages.

In the case of the railways, two Canadian companies (Canadian National and Canadian Pacific) share most of the Canadian traffic and even seek business in the United States, where they must compete with many recently deregulated and fiercely competitive companies. They are also competing on both sides of the

Table 63

The Grain Industry in Canada: Main Parties Involved

Agency	Main Activities
Canadian Wheat Board (CWB)***	World-wide marketer of wheat, oats and barley grown on the Prairies. It is estimated that 80% of Canadian grain sold abroad is sold through the Canadian Wheat Board.
Department of Industry, Trade and Commerce Grain Marketing Division*	Develops and consolidates export markets through trade representatives. Explains Canada's international grain policies to world food and agriculture organizations (UN, ICB, OECD, GATT). Ensures intergovernmental liaison during negotiations and agreements. Works closely with the CWB.
Agriculture Canada*	Activities concentrated on regulatory activities, research and programs to assist grain growers.
Canadian Livestock Feed Board*	Ensures supplies of feed for producers in eastern Canada and British Columbia.
Canadian Grain Commission*	Sets and maintains quality standards for Canadian grain.
Department of External Affairs CIDA**	Through its foreign aid program, purchases Canadian grain for distribution to developing countries. From 450 000 to 600 000 tonnes of grain and wheat flour are handled by CIDA, making it an important customer of the CWB.
International Grain Institute of Canada**	Non-profit corporation financed by Department of Industry, Trade and Commerce and the CWB. Maintains markets and opens new outlets for grain and oil seeds and their by-products. Works in close collaboration with the CWB.
Canada Grain Council*	Unites various non-governmental agencies in the grain industry, providing them an opportunity to discuss various topics affecting the industry. Advisory body.
Rapeseed Association of Canada*	Represents the growers and sellers of rapeseed. Coordinates production and marketing of rapeseed.
Private companies (Cargill, United Grain Growers, Continental Grain, etc.)**	Most of these companies are exporters accredited with the CWB, which means the Board can sell them grain for later sale to their customers. They participate in sales involving grains not marketed by the CWB (linseed, rye, rapeseed, oats, feed barley, etc.)
Canagrex*[1]	Main purpose is to facilitate and promote the export of agricultural and food products. However, it is required to comply with the Canadian Wheat Board's requirements when trading in wheat, oats and barley and their products.
Export Development Corporation (EDC)	Purpose is to facilitate and increase Canada's export trade through its insurance, guarantee and loan services. However, sales of raw materials and consumer goods and products are not eligible for EDC financing.

Key: *** Agency plays a front-line marketing role, in terms of jurisdiction and volumes sold.

** Agency plays an important marketing role, in terms of quantity.

* Agency has a support role in marketing grains.

1 Bill C-85, Canagrex Act, given royal assent on June 29, 1983, p. 9. The corporation was officially created on January 3, 1984. Recent political statements suggest, however, that it may be abolished.

border with carriers on inland waterways: barges on the Mississippi system and lakers in the St. Lawrence-Great Lakes system. In the latter case, however, Canadian grain and iron ore traffic is reserved for Canadian carriers.

A number of small, ocean-going vessels belonging to customer countries, particularly in Eastern Europe, also sail to the Great Lakes and load grain. However, most of the ocean-going vessels on the St. Lawrence-Great Lakes system are too large for the St. Lawrence Seaway, and stop in St. Lawrence ports. There are two different kinds of ships: tramps, which often fly flags of convenience and can quote a price anywhere, any time, generally for bulk cargo, and liners, which ensure regular shipping service for containerized or non-containerized general cargo between two ports or regions.

Usually, these steamship lines form conferences, which set agreements on rates and divide up routes. But there are also lines operating independently on the same routes.

On the North Atlantic route, CP Navigation and Dartcan Inc. have formed a new company called Canada Maritime, which operates in conference with Manchester Lines to serve the St. Lawrence, while CAST and SOFATI have combined to form the independent CAST NORTH AMERICA 1983 Inc. These companies link Montréal to Felixstowe, Hamburg, Antwerp and Le Havre. Cast (83) Inc. has just signed an agreement to service the Mediterranean. Also worth noting are the national lines which operate regularly, such as Arctic Lines (USSR) and Polish Ocean Lines (Poland).

Table 64, taken from *Canadian Sailings*, lists some of the main routes.

Naturally, these companies compete to service Québec, Ontario and the Great Lakes and New England states. Moreover, they compete with the lines that service the same hinterland but from Baltimore, New York, Philadelphia, Boston, St. John and Halifax.

This is a good opportunity to discuss the maritime conferences, because their situation could be affected by the promulgation of a new code of conduct by the United Nations, affecting maritime transport of bulk cargo and likely to be applied to general freight.

It is probably unnecessary to recall that a maritime conference is an association of maritime carriers on a given ocean route that agree on common rates, prices and terms.[1] This system, in operation for more than a century, developed in response to brisk competition during periods of overcapacity.

The conference system limits competition among its members and reinforces their position with respect to other lines. This form of operation was little appreciated by Third World countries, whose members exerted the required pressure on the United Nations to create a new code of conduct applicable to maritime transport of general freight. Designed with the goal of regulating world maritime shipping, it has been in effect since October 1983 and applies to general cargo traffic. The new code recommends fair sharing of traffic among the countries which adopt it in principle. However, it is still difficult to evaluate the impact of the new guidelines since the United States has been particularly firm in its opposition to recent measures. Canada has not yet taken a stand, but pressures are now being exerted for the country to clarify its position.

Québec has already submitted, through the Projet Saint-Laurent, a brief to the Task Force on Deep-Sea Shipping recently established by Transport Canada and chaired by Professor Gunnar-K. Sletmo, of the École des hautes études commerciales (HEC). This task force is examining the changes occurring in the international maritime sector and the relevance of establishing a Canadian merchant marine.

The complete brief sent to the federal task force is appended because it presents a general discussion likely to clarify many of the problems involving recent trends or changes and the need for consultation among the parties involved in maritime trade. Among other things, it establishes the reasons why Québec should have an agency in direct and constant communication with these parties.

1.4.3 Governments and Agencies

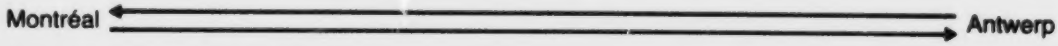
We must now consider governmental and semi-governmental services associated with maritime transport in various ways. To fit them all in an organization chart would be impossible, particularly since several levels of government are involved.

1 There is a major study on the subject of maritime conferences by the Canadian Transport Commission: DAVIS, J.E. (1983), *Pricing in the Liner Shipping Industry*, A Survey of Conceptual Models, CTC Research Publication 1983/04, 127 pp.

Table 64

Port of Montréal Container Services in 1983

CAST



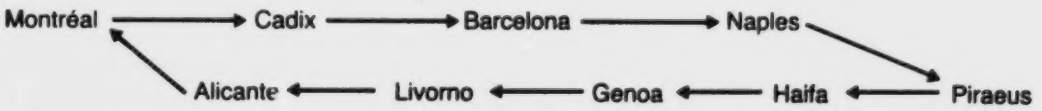
Service: 4 times a month

C.P. Ships, Dartcan Inc., Manchester Liners

Service: 4 times a month

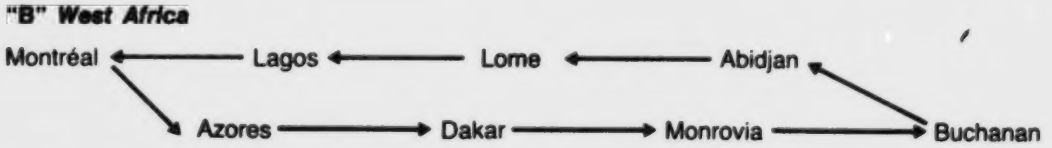
Farrell Lines Inc.

"A" *Mediterranean*



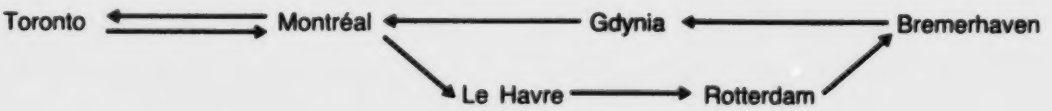
Service: twice a month

"B" *West Africa*



Service: twice a month

Polish Ocean Lines



Service: 3 times a month

Just as an indication, there follows a review of public institutions and agencies whose activities or policies are likely to affect the development of maritime commerce and navigation on the St. Lawrence.

We will look first at Québec departments and agencies, then at federal government departments and agencies, finally at various international agencies.

Obviously, these lists are not intended to be complete.

Governments and government agencies have a major impact on transport. They issue permits and determine the conditions for training and operation, regulation or deregulation; they directly and indirectly subsidize various forms of transport, while recovering construction and maintenance costs through tolls or user fees. Governments also assume a major portion of the responsibility for safety at sea, take care of aids to navigation (buoys, markers and beacons) and conduct charting, dredging and icebreaker services in cold regions. They are also responsible for customs and pilotage. And their economic policies have a substantial impact on maritime trade.

Québec Departments and Agencies

In recent years, Québec has gradually become more open to the maritime world. In 1978, in order to structure its activities in this sector, the ministère des Transports created a Maritime and River Transport Administration.

The main fields of activity of this administration are ferry services, coastal services and ferry-rail service. In the last fiscal year, the total budget for all these activities was in the order of $20 million.

There are now some thirty ferry services, 21 of which ply rivers and lakes within Québec and 7 of which link Québec with other provinces in eastern Canada. Of the 21 services operating within Québec's borders, 11 benefit from Québec government subsidies for a total of $15 million, and six are operated by the Société des traversiers du Québec. Among these services, the Québec City-Lévis and Baie-Sainte-Catherine-Tadoussac ferries are dominant, in terms of both passenger and vehicle traffic.

Furthermore, the Maritime and River Transport Administration of the Québec ministère des Transports gives grants for the operation of two coastal steamer services for the Moyenne and Basse-Côte-Nord and the Îles-de-la-Madeleine. It also coordinates maritime service for Nouveau-Québec. The total amount of subsidies paid for these coastal activities was nearly $5 million for 1982-1983.

Photo: Ministère des Transports

The* Camille Marcoux *is one of six ferries operated by the Société des traversiers du Québec. She plies between Matane and Baie-Comeau.

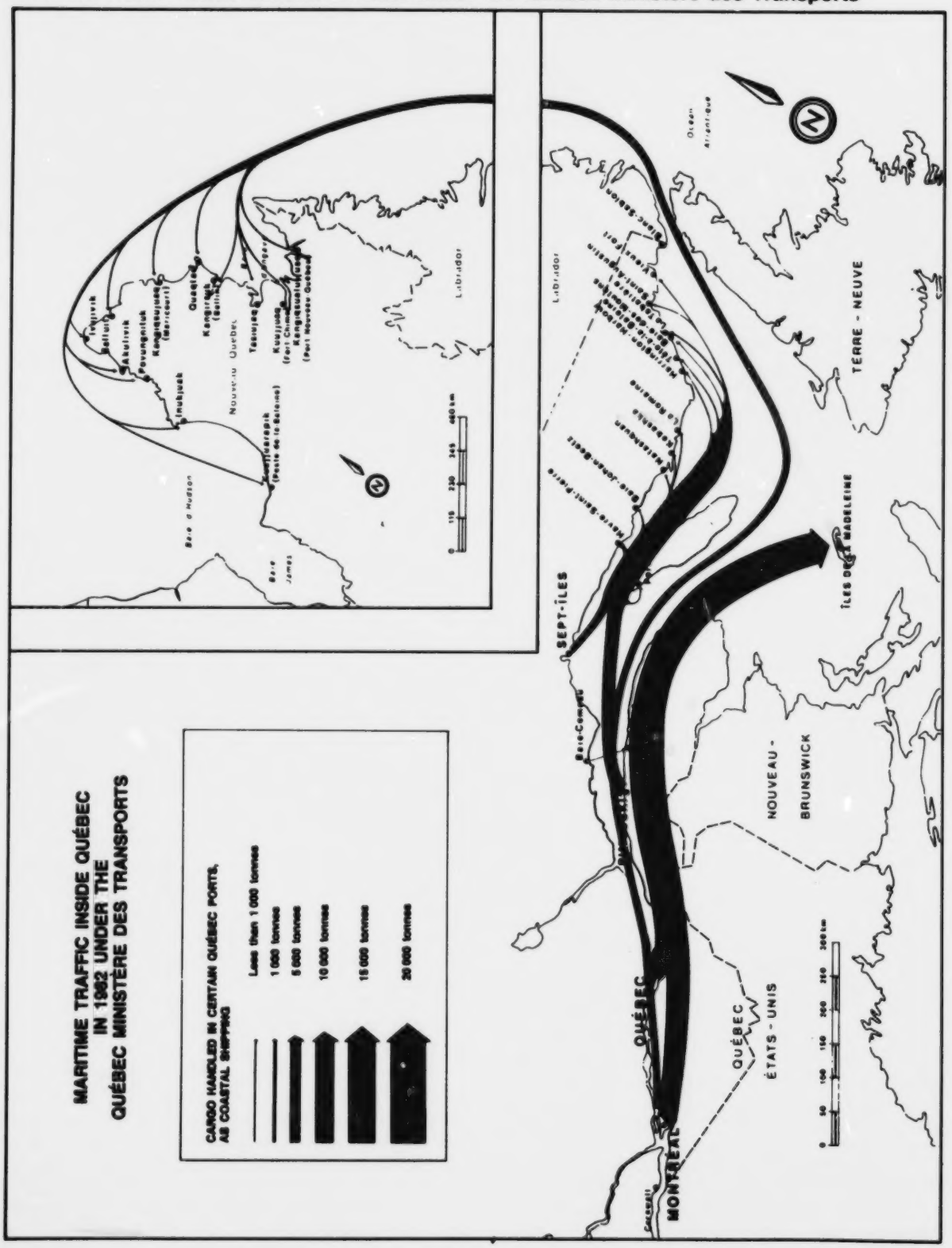
Table 65 provides an overview of Québec maritime traffic under the ministère des Transports in 1982.

The department is also participating in the project for developing the rail-ferry service linking the port of Baie-Comeau to Matane and later Port-Cartier to Sept-Îles. Its presence is also felt in certain ferry infrastructure projects, to which it allocates a good part of its budget.

In 1976, the Québec government also contributed to the establishment of Sonamar Inc., a navigation company whose shares are owned as follows: 25 % by the Québec government (ministère des Transports), 25 % by Logistec navigation Inc., 46 % by Groupe Desgagnés and 4 % by a group of small shareholders. The investment in Sonamar was intended to enable this company to hold a competitive position in the maritime transport market. Moreover, in the early 1980s, Sonamar obtained the long-term contract for transporting salt from the Îles-de-la-Madeleine. More recently, the government transferred its holdings in Sonamar to the Société québécoise des transports. The main goal of this corporation, which has a large capitalization, is to promote transport development to satisfy the commercial and industrial needs of Québec, expand exports of goods produced here, and maximize the socio-economic spinoff for Quebecers.

Table 65

Maritime Traffic Inside Québec in 1982 Under the Québec Ministère des Transports



The Québec government also owns the port of Bécancour, which services the central Québec industrial park and is a majority shareholder in Société Inter Port, which is planning to build a port of a similar nature at Pointe-de-la-Martinière. Through the SGF, it is also 66% owner of Marine Industrie Ltée, which is involved in shipbuilding. Furthermore, it trains maritime officers at the Rimouski CEGEP, Institut de marine.

In addition, any maritime carrier (except Société des traversiers du Québec) providing transport on Québec waters for money must hold a permit from the Commission des transports du Québec. This is based on Order 3N (dating from 1961) respecting the transport of passengers and freight by water.[1] The other legal text regulating maritime transport activities in Québec is Regulation 15 (1973), respecting standards for ferry rates and tariffs.

Finally, Québec has jurisdiction over land use planning in its territory, even under water, and owns most riverfront rights, even though the federal government has acquired control over important areas, mainly through port development and wet land purchases for conservation purposes. It can orient the development of the St. Lawrence corridor, including the port sector. Québec is a major client for maritime services through a number of corporations, including SAQ, Rexfor, Hydro-Québec, SOQUEM, SELEINE, SOQUIP, SIDBEC-Normines and Donohue, to cite the most important.

Finally, the Projet Saint-Laurent itself, the source of this report, is a Québec creation.

In the more important maritime projects, participants from Québec are numerous. One example is the port of Montréal. Table 66 illustrates planning and organizational structures and lists the parties involved.

1 Order 3N will be amended or repealed shortly.

Federal Departments and Agencies and International Groups

The American and Canadian governments built and operate the St. Lawrence Seaway. The Americans are responsible for two locks between Montréal and Lake Ontario and the Poe Lock at Sault Sainte Marie, while Canada is responsible for the eight Welland locks and five locks between Montréal and Lake Ontario. The American ports are private or under the jurisdiction of a city or county. In Canada, on the other hand, the major ports are basically under the jurisdiction of Transport Canada, either as Canada Ports Corporation ports or Commission ports. The ports of Montréal, Québec City, Trois-Rivières, Chicoutimi, Baie-des-Ha! Ha! and Sept-Îles are under the CPC. Ports Canada was the result of the passage and promulgation of Bill C-92, which transformed the former National Harbours Board into a Crown corporation which administers a number of ports. Some of these ports have become crown corporations themselves, those at Montréal and Québec City, for example.

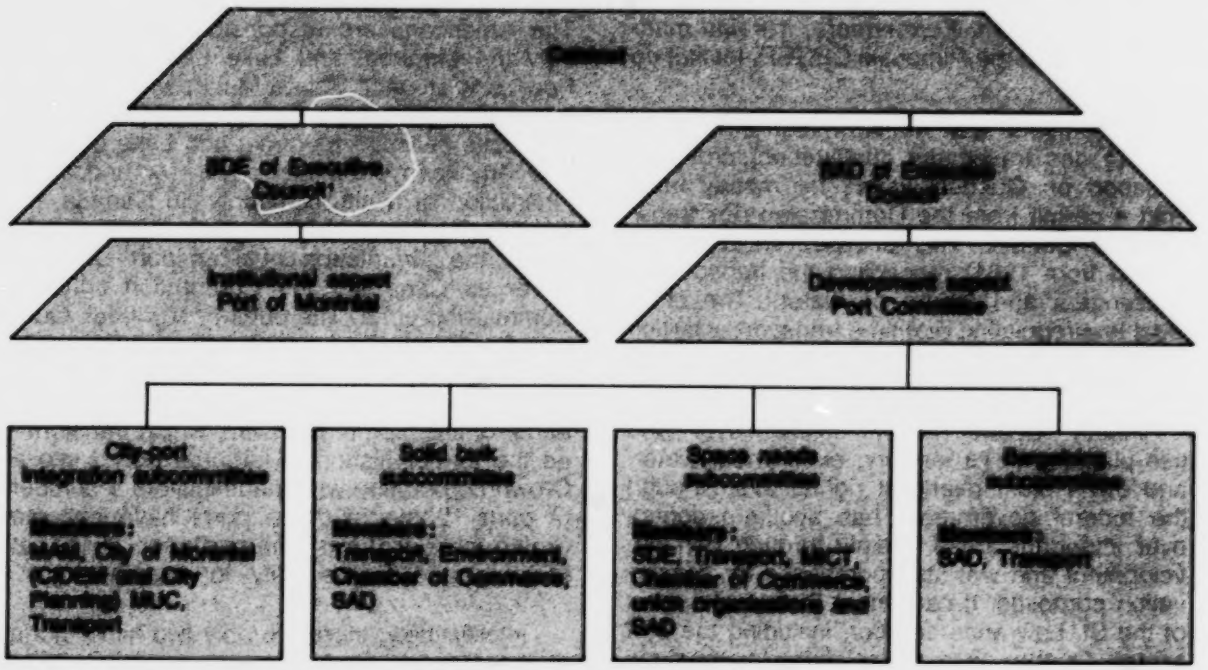
Interestingly, there are only two minor ports of the Canada Ports Corporation in Ontario: Prescott and Port Corborne. Bill C-92 did not affect the status of the ports of Toronto, Hamilton, Oshawa, Windsor and Thunder Bay, which remain ports governed by commissions and are more autonomous than Corporation ports. The Corporation ports are more closely controlled by Ottawa, which must obviously take the ports of St. John and Halifax into account when dealing with Québec ports and the Seaway. On the other hand, the ports managed by commissions each have their own legal status, and regional representatives serve on their board of directors.

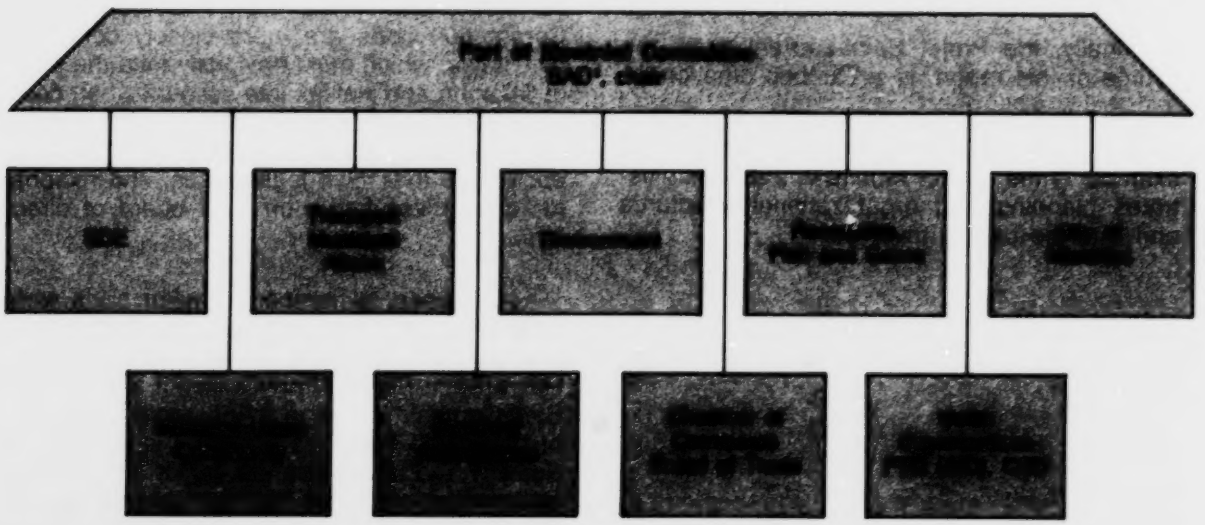
In Québec, a number of major ports were built and are managed totally or partially by private companies. Sept-Îles, Pointe-Noire, Havre-Saint-Pierre, Port-Cartier, La Baie and Baie-Comeau are all in this category. The City of Valleyfield manages a municipal port on the Seaway and, as mentioned earlier, the Québec government manages the port of Bécancour. Finally, Société Inter-Port is planning to establish port facilities at Pointe-de-la-Martinière, near Québec City. This group is a joint venture of the governments of Québec, Canada and the Québec Urban Community.

Table 66

Port of Montréal — Parties Involved in Planning

Decision-making Bodies in 1982





1 SDE (Secrétariat au développement économique — Economic Development Secretariat).

2 SAD (Secrétariat à l'aménagement et à la décentralisation — Development and Decentralization Secretariat).

Source: Ministère des Transports du Québec, 1981.

Transport Canada and Fisheries and Oceans Canada administer many secondary docks and harbours along the St. Lawrence and around the gulf.

The Canadian Transport Commission is responsible for regulating this sector. Its objective is to promote coordination of carriers of all kinds: railway, ship, airline, pipeline and interprovincial motor vehicle transport. For this purpose, it can issue regulations respecting freight transport, conduct research, and participate in the preparation of federal policy.

The scope and extent of federal intervention in maritime transport on the St. Lawrence has always been justified by the international status of the river and its use in international trade. However, the centralization of decisions often causes problems. Many decisions are considered to be irrational by users and by Quebecers.

Consider, for example, the distribution of icebreakers. Four heavy and medium icebreakers work around the ports of Halifax and St. John, while for the 1 500 km of the River from the Gulf to Montréal, only three medium and two light icebreakers are available. The disproportion is flagrant, given the surface covered or the circumstances justifying the use of icebreakers. The impact on employment is also great since a medium icebreader provides employment for some 66 to 88 person-years.

With respect to port facilities, it is by no means obvious that the Government of Canada must play an essential role or control the most important ports. Even though it does try to divide efforts between the ports on the St. Lawrence and the maritime provinces, federal government control of this sort in no way reinforces the versatility now indispensable in ports. On the contrary, as is clearly shown by the problems of the economy, such an approach may interfere with the growth of regional economies and occasionally even weaken the economy as a whole. In the short, medium and long terms, it appears increasingly necessary to promote local, as well as regional and provincial, initiative and control. The experience of the greatest possible autonomy in local business communities has proved its worth, particularly in the field of maritime transport. Furthermore, the growth of maritime trade in Canada should convince even the most reluctant to encourage initiatives and autonomy in port districts of cities and towns and a more decisive role by the provinces in planning and developing maritime activities.

On this subject, at a symposium on the St. Lawrence-Great Lakes system in June 1982, the Prime Minister of Québec made the following remarks:

> The local port corporations which must exist should have real powers, such as those of appointing directors, marketing, pricing of services and investments in development projects located within the port boundaries, that is, in the harbour districts of our cities.

Until now, centralization has been such that it has discouraged many Québec initiatives on port services, both public and private, even though this is not a jurisdiction reserved to the federal government. The recent legislation creating the Canada Ports Corporation is a step in the right direction.

In any case, purely for information, we have prepared a list of federal and international agencies whose activities affect navigation and maritime trade on the St. Lawrence.

Federal or International Agencies Whose Decisions Affect Maritime Trade on the St. Lawrence

External Affairs (CIDA)

Indian and Northern Affairs

Agriculture Canada
— Canadian Wheat Board
— Livestock Feed Grain Office

Supplies and Services Canada

Lake Ontario Water Regulation Board

Canadian National

Ducks Unlimited

Québec-Ontario-Federal Committee on the regulation of the waters of the Ottawa Valley

International Joint Commission

Treasury Board

Council of Great Lakes Governors (to Trois-Rivières)

National Defence

Energy, Mines and Resources Canada

Environment Canada
— Federal Environmental Impact Board
— Inland Waters Directorate
— Parks Canada
— Canadian Wildlife Service
— Environmental Protection Service

Great Lakes — St. Lawrence Maritime Forum

RCMP

Justice Canada

Fisheries and Oceans Canada
— Arctic Biology Centre
— Champlain Centre for Marine Sciences
— Eastern Québec Marine Resources Research Centre
— Maurice Lamontagne Institute
— Captain Bernier Laboratory

Revenue Canada

Health and Welfare Canada

Solicitor General of Canada

Transport Canada
— St. Lawrence Seaway Authority
— Pilotage authorities
— Committee for the expansion of ports and traffic in Canada
— Canadian Transport Commission
— Port commissions
— Québec Regional Advisory Council
— Coast Guard
— Ports Canada
— Canada Ports Corporation
— Local port corporations

Labour Canada

Public Works Canada
— Société du Vieux Port (Montréal)
— Société du Vieux Port (Québec City)
— Société du Vieux Port (Trois-Rivières)

World Wildlife Fund (Canada)

1.4.4 Manpower

There are many trades associated with navigation and maritime commerce, as well as associations and groups. Rather than listing each of the extremely numerous trades or professions involved, we will discuss some of the more important groups formed especially for the purposes of shipping and maritime trade: stevedores, crews, and pilots, then two other groups whose activities are not necessarily conducted on ship or in port: the forwarders and insurers.

Before turning to these points, we should mention that the vast subject of manpower contains many topics that should and would be discussed if the necessary studies were available. Recruitment, education and practical training of candidates for maritime professions, the career profile of the sailor and the role of women in the maritime sector all deserve consideration, as do maritime law and legal services, benefit programs and the status of sailors. And these are only a few suggestions. In fact, the industrialization of maritime activities has somewhat obscured the life of sailors. Labour in the maritime trade and navigation sector has been neglected.

Longshoremen

The behaviour at work, productivity and organization of port workers play a decisive role in making one port more attractive to users than its competitors.

Contrary to what happens in other countries, the United Kingdom in particular, Québec longshoremen are not usually hired by port officials but work for contract stevedoring companies.

With the advent of containers, manpower needs in ports have diminished substantially. A program for early retirement with incentive payments made it possible to substantially reduce the labour force, and the workers who remained are entitled to a guaranteed annual minimum salary. Their work is also much more skilled, since while there is now very little truly manual work to do, there is more machinery (cranes, loaders, etc.) to operate.

In some ports in Québec, including those associated with the Canada Ports Corporation, the unions are affiliated with the International Longshoremen's Association (ILA). This involves most of the workers. Elsewhere, in the ore ports on the Côte-Nord, for example, the unions are affiliated with the United Steelworkers of America. In the case of unions with ILA affiliations, negotiations are conducted with the Maritime Employers' Association.

At this time, labour relations in the ports of Québec are satisfactory. There has been some union raiding, but the reputation of the stevedores and their associations is not only good, it is better than that of American longshoremen, with respect both to work climate and to union demands.

Crews

The personnel on board the ships of the Great Lake fleets are affiliated with the powerful Seamen's International Union (SIU), while for ocean-going vessels, the situation varies considerably, depending on the flag and the owner of the vessel. Employees of the major shipping lines are also affiliated with the SIU, as would probably be those in any future Canadian merchant marine. On the other hand, vessels from Eastern European countries are not subject to rules of this kind. Moreover, ships that sail under flags of convenience, tramps in particular, often recruit cheap and occasionally inexperienced manpower in the developing countries.

Photo: Canadian Coast Guard

Since earliest times, many Quebecers have been attracted to the trades and professions of the sea.

Many Quebecers serve on the crews of the laker fleets or the ocean-going liners. Unfortunately, few studies or efforts have been made to support this job category. Is it even recognized? Who tries to increase the number of jobs available to Quebecers? Nor is there any shortage of questions on job health and safety. It might be possible to minimize some of the major drawbacks inherent in a sailor's life, such as the long absences.

Here again, providing information for sailors in appropriate media would assist in promoting discussion of ideas and initiatives among Québec sailors.

Pilots

The St. Lawrence pilots are probably the oldest group of professional sailors in the country. In every country with a navigable waterway system, captains have turned to a local group of experienced sailors to protect ships and accelerate transit in difficult passages. For this reason, organization into corporations occurred early. The current situation is the natural outgrowth of the English "Trinity houses", introduced in the early 19th century, more precisely in 1805. Many river villages soon became — and still remain — preferred sites for recruiting pilots.

With time, regional pilots' groups, administrations and corporations multiplied. Laws and regulations defined their duties, rights, privileges and obligations. In 1971, as the result of a Royal Commission of Inquiry on Piloting, which lasted nearly ten years, the Pilotage Act, Bill C-52, was given royal assent. It created four regional piloting administrations called Authorities: Atlantic, Great Lakes, Pacific, and, for the area that interests us most, Laurentian. This Authority contains three separate corporations: the Lower St. Lawrence Pilots Corporation, the Pilots of the Central St. Lawrence Inc., and the Corporation of Pilots of the Port of Montréal. Each of these has an exclusive contract with the Laurentian Pilotage Authority for the services in its territory.

The contract sets the rate of pay for the pilots, while the Authority determines the fees charged to the ships. With only a few exceptions, the use of corporation pilots is compulsory. All those who pass the exams administered by the corporation are eligible for the title and papers.

Great Lakes carriers, whose captains are experienced and familiar with the routes, consider the mandatory use of pilots on the St. Lawrence and Great Lakes unnecessary but are not opposed to the obligatory examination administered by the corporations. They say it is a question of economy, while being concerned, of course, for safety.

An association of the owners of 90 % of the Canadian ships that sail on the Great Lakes and the St. Lawrence, the Dominion Marine Association, says it favours the minimum use of compulsory pilotage at economical rates commensurate with safety. And a quite similar opinion has been stated by D. K. Gardiner, president of Misener Transportation:

> By virtue of employing Canadian officers entirely familiar with the St. Lawrence, these ships could gain a competitive advantage over foreign vessels if compulsory pilotage regulations could be modified in such cases.

The pilots point to safety on the one hand and the universal access to their examination leading to pilot's papers, on the other. They believe the way things currently operate is fair. How could anyone decide in fact, fairly and safely, which carriers would be exempt from using corporation pilots and which would not? As for costs, the corporations say that they

account for only a tiny part of the total operating costs of the ships. In addition, use of duly accredited pilots certainly allows carriers to save large sums of money in insurance premiums, the pilots point out, not to mention the fact that the ships move more rapidly and the captain's job is made easier.

1.4.5 Freight Forwarders

Freight forwarders connect business firms with foreign markets by making sure that the goods are transported to the right port in the right condition. As some like to put it, freight forwarders are travel agents for cargo. Customers are not required to use their services, but increasing numbers find it to their advantage to do so.

The usual functions of the forwarders can be divided into three categories:

(a) functions directly related to transport, such as chartering space with carriers, consolidation of shipments, renting, loading and arranging containers, door-to-door transport, etc.

(b) functions secondary to transport: customs brokering, crating for export, inspection and control of cargo, documentation, storage, maritime insurance, consultation on transport, etc.

(c) functions usually associated with international trade: identification of potential customers, marketing advice, billing for exporters, collection, credit, etc.[1]

Naturally, not all forwarders perform all these functions, and in some cases they do others as well. Many major exporting companies either have their own shipping departments or entrust a specific portion of the task to forwarders. That is the case with many multinationals, like Ford, Renault, Shell and Nestlé.

In Europe, large firms often join together to entrust their forwarding business to an independent company, which is why the largest forwarders turn out to be European.

Among the major forwarders working in Québec are SCAC (France) — FPS, Kuehne & Nagel (FRG), Dolbec Y. Logistique internationale inc., St. Arnaud et Bergevin, Schenker AG (FRG), Thomas Meadows (UK), and Panalpina (Switzerland), all companies represented in the world's major ports.

The most recent guide to the Port of Montréal (1984-1985) lists 133 forwarders' offices.

Forwarders are paid according to a fixed percentage (1.5 to 8 %) of the value of the freight shipped. They may also receive an additional premium from the shipper.

Without a doubt, forwarders play a key role in the selection of routes and carriers, because they often serve as consultants on these subjects to companies. Nor should they be neglected as targets for information on the advantages or conditions of St. Lawrence shipping. Furthermore, the role they would have in the establishment of the future computer system on the movements of cargo in the St. Lawrence and Great Lakes corridor must be taken into consideration.

Also worth noting are the functions of the non-vessel operating common carriers, usually known as the NVOCCs or NVOs, who consolidate maritime loads in one or more containers for consignment on a ship, looking after the movement of freight to its final destination. The NVOCCs do not have their own ships but work closely with transport companies that offer transport services. The NVOCCs also coordinate land shipment of freight going to or coming from a port. Generally, they obtain lower rates because they act as wholesalers for the carriers, providing them with a regular volume of container traffic.

1.4.6 Insurers

This category easily contains a large number of parties: ship registry and risk appraisal companies like Lloyds, claims adjusters, groups of insurers (risk sharing), and brokers. All usually work in close collaboration, in order to give steamship line operators and other customers appropriate protection.

1 DENIS, J.E., (1982), "Les maisons de commerce et les transitaires internationaux: atouts pour le développement international de Montréal" (Trading companies and International Forwarders: Assets for the International Development of Montréal) in *La Vocation internationale de Montréal: Mythes et Réalities*. CETAI, HEC.

Then there are the general coverage clubs, a form of mutual insurance intended to cover risks excluded from the usual insurance policies. As civil liability has grown, so have measures to offer protection against its risks (oil spills, job accidents, etc.). For this purpose there are associations of Québec shipowners flying the Canadian flag.

The insurance sector is largely controlled from outside, and the eminent British tradition in this field is well known. Nevertheless, in Québec, several large insurance companies are already active in the maritime sector. The wish is often expressed that insurance companies recognize the risks of winter shipping on the St. Lawrence have substantially decreased, since steps have been taken to overcome the problems. There is a widespread desire for premiums to be lowered for regular users who have adopted the methods recommended for safer navigation. It is also sometimes mentioned that insurance costs could be reduced by grouping fleets together.

Before turning to maintenance and operating costs, and then closing this first section, which is not intended to be exhaustive in references to parties involved, there are two other groups to be mentioned, whose activities are also very important. First are the agencies like the Société générale de surveillance, whose headquarters are in Geneva. This is comparable to many control agencies that guarantee the quality and quantity of products transported, traded, imported or exported. They have considerable influence because they affect perhaps 90 % of international trade.

And finally, there are the media, particularly the specialized media: data bases, satellite systems, television programs and magazines, whether regular or sporadic, popular or technical. This is an immense field which undoubtedly, in Québec as elsewhere, has the capacity to accelerate the transmission of information and make it more immediately accessible and useful. These also provide opportunities for policies, innovations and opinions to be made known and public, and social, political and economic issues to be debated.

A number of specialized magazines are well known and circulate widely throughout the world: *Journal of Commerce, Journal de la marine marchande, Bureau Véritas Review, Bulk Systems International, Seaway Review*, etc.

In all these fields, Québec initiatives have been embryonic and excessively isolated. Even the most promising initiatives have scarcely survived the difficult early stages, for lack of appropriate support. Maritime journalism, designed to provide regular information on maritime traffic or circulation, has been abandoned by Québec's major print and electronic media. Scientific journals publish little on the subjects of concern to us or do so in a disorganized and scattered way. Publishers cover only a few limited aspects. Programs of assistance are unattractive or inappropriate.

There are some projects pending, involving data bases and electronic or computerized information, publishing, etc. But this is a field in which more thorough joint effort is called for.

Generally speaking, with regard to the many groups involved in maritime trade and navigation on the St. Lawrence, there is an extremely varied range of areas, suitable for joint action, where such coordination has been non-existent.

The St. Lawrence is a major transportation artery, like the Rhine or the Mississippi. It inevitably affects a host of interests, from the major multinationals, in particular those involved with commodities (grain, refined petroleum, ore) and major government services (departments, Coast Guard, transport, ports), as well as a plethora of small industries or barely visible customers. Inevitably, the relations among these groups are extremely varied. Transactions between carrier and customer may involve a company that owns its own ships or even its own port facilities (like Gulf Canada or Québec-Cartier) or an isolated customer seeking the best price for a one-time shipment of a few containers to Europe.

Promotion of the St. Lawrence will not involve the same things in every case. However, in all cases, the costs must be competitive. Agencies like the Seaway Authority or the major Québec ports are aware of this. Programs, including commercial promotion programs, must reflect the true scale of the traffic involved, which exceeds many jurisdictions. We must act together, which is not always the case at the moment. The Québec government, like other governments, has a very important role to play. Other opportunities for joint action should be sought out, because it is often the more effective approach. That this by no means excludes direct initiatives is proven by the growth of the industrial port zone of Bécancour.

There remains the question of costs, employment and the economic advantages from maritime trade, to complete this first chapter.

1.5 Costs and Employment

The operation of a navigable waterway and major port installations like those in the St. Lawrence-Great Lakes artery entails major maintenance and operating costs. Furthermore, many jobs are involved and value is added to the economy. But let us take a closer look.

1.5.1 Maintenance and Operating Costs

A major portion of the maintenance and operating costs of the seaway are charged to Transport Canada through the Canada Ports Corporation, the ports commissions, Seaway Authority, Pilotage Authorities, Coast Guard and Ports and Harbours.

Expenditures by the Canadian government to meet its maritime responsibilities are listed in the annual reports of Transport Canada and its Crown corporations. The overall budget of the Canadian Marine Transport Administration for 1983-1984 was $645 801 000, of which $547 566 000 went to the Coast Guard, as can be seen in Table 67.

It is not possible, however, to know precisely what portion applies to the Laurentian region. At best, certain deductions can be made by analysing the composition of the Coast Guard fleet. In view of the geographic distribution of Coast Guard units, the impression clearly emerges that the St. Lawrence is underequipped in terms of particular kinds of vessels, particularly icebreakers and rescue ships in the estuary and the gulf.

For the icebreakers, see Table 68.

We obtained details on dredging requirements and costs from the Coast Guard office in the Laurentian region. The object of the dredging program is to maintain the water depth given on official marine charts: 10.6 metres between Québec City and Montréal, and 12.5 metres between Québec City and Cap Gribane. This section was dredged in 1973 at an approximate cost of $19 million.

Since 1977, the average annual cost of maintenance has varied between $1.7 and $3.0 million with work concentrated in three spots in the channel: the north channel between Cap Gribane and Saint-Jean on the Île d'Orléans, Cap-Santé, and the port of Montréal, where stones torn up by anchors must be removed. In addition, maintenance of the small ports and harbours below Québec City costs between $1.5 and $2.0 million a year.

We know the revenue and expenditure for 1981 and 1982 of the six Québec ports run by the Canada Ports Corporation. Only the port of Sept-Îles still operates at a loss, while Montréal and Québec City bring in good profits.

Table 69 summarizes operating revenue and expenditure data. However, the figures do not include the costs of amortizing the considerable sums invested in recent decades to acquire land and develop the ports. On the other hand, some recent investments are entered and the situation varies drastically from one port to another.

The revenue of the public wharves and harbours is estimated at $1.5 million annually. Capital expenditure for 1983 accounted for the largest part of the $20 million budget.

The Seaway is another story. All the facilities run by the Authority are located in the St. Lawrence-Great Lakes system. Official budgets and annual reports are therefore available. Better still, since 1959, the accounts for the two sections have been kept separate, making possible a comparative analysis.

The Seaway Authority is responsible for administering the Welland Canal and the Montréal-Lake Ontario section. At first everything was supposed to pay for itself over a fifty-year period. The initial debt amounted to $340 million for the Canadian side of the Montréal-Lake Ontario section, to which must be added $131 million for the Welland Canal debt. Since then, $7.5 million have been invested between Lake Ontario and Montréal in order to add one month to the shipping season.

It was soon realized that the tolls would never bring in enough to cancel the debt. In 1977, the Government of Canada agreed to convert $625 million in unpaid debts into government assets and $216 million in unpaid interest into an interest-free loan that would eventually be cancelled. Now the Authority's

Table 67

Breakdown of the 1983-1984 Budget of the Marine Transportation Administration
(in thousands of dollars)

Resources Activity Provided Through (in thousands of dollars)	Ports & Harbours	Canadian Coast Guard	Policy & Planning	Canarctic Shipping Company Limited	Harbour Commissions	Canada Ports Corp.	Pilotage Authorities	St. Lawrence Seaway Authority	Total
Aids to navigation		283 893							283 893
Ship movement systems & services		81 769							81 769
Icebreaking, Arctic and other ship support		94 169	3 952	3 052					101 173
Marine search & rescue		60 469							60 469
Regulatory		31 965							31 965
Public wharves & harbours	44 257				6 674				50 931
Direction & Administration		40 301	3 988						44 289
Major ports						32 486			32 486
Bridges								3 306	3 396
Canals									
Pilotage sevices							430		430
Total appropriation	**44 257**	**547 566**	**7 940**	**3 052**	**6 674**	**32 486**	**430**	**3 396**	**645 801**
Crown Corporation Budgets									
Income				9 558		241 326	59 336	86 775	
Expenses				12 610		189 252	58 963	91 829	
Profit (Loss)				(3 052)	52 074	373	(5 054)		
Capital spending						106 551	269	8 935	

Source: Transport Canada, 1983-1984 Estimates, Part III, Expenditure Plan, p. 3-10.

Table 68

Icebreakers of the Canadian Coast Guard Fleet

Type of Ship	Region	Number of ships	Name of ship
Heavy Icebreakers (1)	Maritimes	1	Louis S. Saint-Laurent
Medium Icebreakers (7)	Maritimes	2	John A. MacDonald Labrador
	Laurentian	3	Des Groseillers Pierre Radisson Norman McLeod Rogers
	Newfoundland	2	Sir John Franklin John Cabot (cable ship)
Light Icebreakers (11)	Maritimes	4	Sir William Alexander Edward Cornwallis Narwhal Walter E. Foster
	Laurentian	2	J.E. Bernier Montcalm
	Newfoundland	1	Sir Humphrey Gilbert
	The western provinces	2	Wolfe Camsell
	Centre	2	Griffon Alexander Henry

Source: Transport Canada, *1983-84 Estimates, Part III, Expenditure Plan*, Supply and Services Canada, Ottawa, 1983, p. 3-70.

Table 69

Operating Revenue and Expenditure in 1981 and 1982 of the Québec Ports Operated by the Canada Ports Corporation

Port	Revenue	Expenditure	Profit (deficit)
1981			
Sept-Îles	1 204 000	1 336 000	(132 000)
Chicoutimi	1 018 000	542 000	476 000
Baie-des-Ha! Ha!	103 000	112 000	(9 000)
Québec City	12 249 000	7 509 000	4 740 000
Trois-Rivières	1 687 000	1 450 000	237 000
Montréal	48 334 000	37 649 000	10 685 000
Total:	**64 595 000**	**48 598 000**	**15 997 000**
1982			
Sept-Îles	1 170 000	1 226 000	(56 000)
Chicoutimi	1 020 000	841 000	179 000
Baie-des-Ha! Ha!	112 000	94 000	18 000
Québec City	14 746 000	9 140 000	5 606 000
Trois-Rivières	1 750 000	1 549 000	201 000
Montréal	52 922 000	44 493 000	8 429 000
Total:	**71 720 000**	**57 343 000**	**14 377 000**

Source: National Harbours Board, *Port Financial Statements for the Year Ended December 31, 1982.*

objective is to collect operating and maintenance costs, including depreciation, from the users. Its American counterpart obtained similar arrangements in 1983.

Since the changes made in 1977, the Canadian Seaway Authority's annual expenditures have increased from $50 million to $62 million in 1982-1983 and its revenues from $48 million to $58 million.

It would be interesting to analyse the operating and maintenance costs on the American side as well. All the major ports made sizeable investments, particularly at the opening of the Seaway. Several ports must be dredged to maintain the required depth. The Americans also have a coast guard and navigation services on the Great Lakes. The Reagan Administration is talking increasingly of recovering costs through user charges.

The costs of operating and maintaining the St. Lawrence-Great Lakes system thus seem great. It must not be forgotten, however, that, from many points of view, the St. Lawrence is an international shipping route (in particular because of the grain, iron ore, coal and container trade). Not that it loses its Canadian and Québec character as a result. But were it to come to a question of applying a tariff policy based on benefit to users, such a policy would have to be geared to reality in order to avoid unduly taxing or penalizing maritime transportation as opposed to other modes. It would be counterproductive, for instance, to hold the efficiency of maritime transportation, or its fuel costs, which are lower than those of other modes for the same load, against it, and, because of that efficiency, increase the burden of this mode, thus rendering maritime carriers less competitive than other carriers. Maritime trade and the maritime economy would adapt very poorly to unwarranted charges.

At the end of 1984, shortly before the Seaway was closed, there was an unfortunate incident at the Valleyfield drawbridge, which could have resulted in a forced wintering-over of the numerous end-of-season ships. Thanks to the mild weather and the diligent efforts of the Seaway Authority, all the ships were able to leave. The delay nonetheless resulted in losses amounting to tens of millions of dollars, although the definitive figures have not yet been calculated.

Apparently, there was no way of predicting that a major part in the bridge would break down. Studies may well reveal, however, that equipment has aged faster than expected,

which will entail considerable expenditure. For the time being, it may be interesting to note that following steps taken to facilitate the departure of the ships around Valleyfield, unusual phenomena were observed in the ice of lac Saint-Pierre. It may be that adjustments to the flow upstream led to the formation of particularly thick ice during January and February, 1985. Studies are being carried out on this subject.

1.5.2 User Charges

The question of user charges has caused a great deal of ink to flow recently in North America. Major ports throughout the world, except perhaps in the Eastern Bloc, are trying to administer their facilities on a profit-earning basis. Both Seaway authorities had been assigned the same objective. It soon became obvious, however, that they would not reach their objective if they had to shoulder the debt resulting from construction. Pilotage is also charged to the users. Only dredging and the coast guard, in North America at least, have remained the responsibility of government. But there is talk of recovering the cost of these too through user charges.

Harbour tariffs remain complex and often involve various elements such as harbour dues, wharfage, mooring dues, and anchorage duties. In addition there are berthage and fees for dock services: fresh water, electricity, etc. The use of tugboats also entails charges.

There are obviously many factors involved in setting these various fees, and there are certain supervisory and self-regulatory mechanisms. However, there are still no analyses that are sufficiently sophisticated to permit of a critical evaluation which, sooner of later, will prove useful. We are therefore inclined to encourage work in this area which is vital not only for harbours and harbour services, but also for merchants and charterers. In the discussion surrounding user charges, it would be dangerous to ignore harbour duties or pilotage charges. These are all factors that play a part in what may be called the marketing of a maritime route. All the costs are important, and the administrative work entailed by them is equally so.

For obvious reasons, a detailed look at Seaway charges would be of interest.

The Canadian St. Lawrence Seaway Authority Act, assented to on December 21, 1951, and its American counterpart, assented to on May 13, 1954, specify that tolls must be fair and reasonable and designed to cover operating and maintenance costs, the interet on loans taken out to finance the construction of the Seaway and the repayment of the principal over a 50-year period. A joint Canadian-American committee periodically analyses and revises the toll rates. The agreement only applies to the Montréal-Lake Ontario section. Four of the Sault Ste. Marie locks belong to the United States and their use has thus far been free of charge, doubtless under pressure from American users who argue that navigation is free on the Mississippi, the Great Lakes' main competitor.

On the other hand, the Welland Canal belongs to Canada. Its redevelopment was completed before the major work on the joint Montréal-Lake Ontario section began. In 1959, however, its $131 million debt, principal and interest, was assumed by the Canadian Seaway Authority. In short, negotiations between the United States and Canada involve the tolls on the Montréal-Lake Ontario section, the revenues from which are shared in proportion to the initial investment: 71 % to Canada and 29 % to the United States. If the United States, under pressure from American users, manages to impose a lower rate, the revenues from the Seaway, 71 % of which are collected by Canada, will be affected. According to the understandings in force, however, both countries must agree to any change in rates.

In 1958, the two countries agreed to tolls based on the annual operating and maintenance costs, the amortization of the debt over a 50-year period, and the expected volume of traffic. When calculating the debt for the Welland Canal, Canada included only the costs of dredging, that is $29 000 000 (principal and interest), disregarding the $142 000 000 cost of building the canal.

What is more, in 1962, the Diefenbaker Administration suspended the low tolls paid on the Welland Canal, without any official explanation. In 1967, the tolls on the Welland Canal were abolished in favour of lockage to be paid at the rate of $100 per lock. Since 1978, there have been different tolls in the two sections and, in addition, lockage to be paid on the Welland Canal. In 1983, the cost of using the Seaway was as shown in Table 70.

Table 70

Tariff of Tolls in Force on the St. Lawrence Seaway, 1983

	From Montréal to Lake Ontario	Welland Canal
1. For Transit of the Seaway		
(1) toll per gross registered tonne	0.08	0.07
(2) toll per metric ton of cargo		
— bulk cargo	0.85	0.31
— general cargo	2.06	0.50
— containerized cargo	0.85	0.31
— government aid cargo	0.52	0.31
— food grains	0.52	0.31
— feed grains	0.52	0.31
(3) toll per passenger, per lock	1.00	1.00
(4) toll per lock on the Welland Canal for any cargo or passenger vessel		
(i) loaded: per lock	—	250.00
(ii) in ballast: per lock	—	187.50
2. For Partial Transit of the Seaway		
— pleasure craft	5.00	5.00
— other vessels	10.00	10.00

Note: In addition, there are "operation" surcharges applicable at the end of every season. These additional user charges are applied to ships that want to use the locks after the Seaway has been officially closed. The rates are $20 000 per day.

Source: The Seaway Authority.

The data in Tables 71 and 72 on operating revenue and expenditure, traffic and total revenue highlight certain interesting facts. Until 1977, the Montréal-Lake Ontario section of the Seaway handled 40 % to 45 % of total traffic but brought in, on an average, 80 % of the revenue. Only since 1978 has it tended to bring in revenues proportional to the traffic it handles, as does the Welland Canal. Two-thirds of the surplus revenue over operating and maintenance expenditure is also generated by the Montréal-Lake Ontario section.

A closer analysis of the tariffs now in force will reveal some of the more noteworthy effects for Ontario and Québec of certain rates on the Welland Canal, particularly bulk transport rates and lock fees.

One tonne of iron ore transiting from Québec to Lake Erie, for instance, must travel through both sections of the Seaway. The tolls for each tonne are therefore $0.31 and $0.85, or $1.16 plus $0.10[1] for lockage on the Welland Canal for a 20 000 tonne cargo, for a total of $1.26 per tonne. However, iron going from Lake Superior to steelworks on Lake Erie is not subject to lockage. This is obviously a factor to take into consideration when studying the competitive position of Québec's iron ore.

To supply a steelworks in Hamilton, the toll for one tonne of iron ore from Québec transiting through the Montréal-Lake Ontario section is $0.85. On the Welland Canal, the toll for one tonne from Lake Superior is $0.41 ($0.31 in tolls and $0.10 in lockage for a 20 000 tonne ship), half the cost of the Québec shipment. In addition, American coal shipped to the steelworks and thermal power stations in Ontario below the Welland Canal benefit from this same reduced rate of $0.41 a tonne. It is therefore not surprising that with 25 % more traffic, the Welland Canal produces only 50 % of the revenue generated by the Montréal-Lake Ontario section.

This is only an example, but it justifies our strong desire for a detailed analysis of the user charges in force on the St. Lawrence-Great Lakes system. Although the amounts in question are not enormous, there is no doubt that Québec may have been penalized by the rate

1 This is an average cost.

Table 71

Operating revenue and expenditure of the Seaway between 1959 and 1982-1983
(in millions of Canadian dollars)

	Montréal-Lake Ontario					Welland Canal					Total		
	Toll and Lockage Revenue	(%)	Operating and Maintenance Expenditure	(%)	Surplus (or loss) Related to Operation Only	Toll and Lockage Revenue	(%)	Operating and Maintenance Expenditure	(%)	Surplus (or loss) Related to Operation Only	Toll and Lockage Revenue	Operating and Maintenance Expenditure	Surplus (or loss) Related to Operation Only
1959	7.1	(86)				1.2	(14)				8.3		
1960	7.2	(85)				1.3	(15)				8.5		
1961	8.1	(85)				1.4	(15)				9.5		
1962	8.9	(94)				0.6	(6)				9.5		
1963	10.7	(100)	2.5	(37)	8.2	—	(—)	4.3	(63)	(4.3)	10.7	6.8	3.9
1964	13.5	(100)	2.9	(34)	10.6	—	(—)	5.6	(66)	(5.6)	13.5	8.5	5.0
1965	15.5	(100)	3.1	(28)	12.4	—	(—)	8.0	(72)	(8.0)	15.5	11.1	4.4
1966	17.3	(100)	3.7	(27)	13.6	—	(—)	10.0	(73)	(10.0)	17.3	13.7	3.6
1967	16.4	(95)	4.1	(32)	12.3	0.9	(5)	8.6	(68)	(7.7)	17.3	12.7	4.6
1968	18.1	(91)	4.4	(34)	13.7	1.8	(9)	8.7	(66)	(6.9)	19.9	13.1	6.8
1969	15.6	(86)	5.0	(37)	10.6	2.5	(14)	8.4	(63)	(5.9)	18.1	13.4	4.7
1970	18.6	(84)	5.5	(37)	13.1	3.5	(16)	9.2	(63)	(5.7)	22.1	14.7	7.4
1971	20.0	(82)	7.2	(42)	12.8	4.3	(18)	9.9	(58)	(5.6)	24.3	17.1	7.2
1972	20.0	(82)	8.1	(42)	11.9	4.3	(18)	11.0	(58)	(6.7)	24.3	19.1	5.2
1973	20.4	(83)	8.4	(40)	12.0	4.2	(17)	12.7	(60)	(8.5)	24.6	21.1	3.5
1974	15.6	(83)	9.5	(39)	6.1	3.2	(17)	15.1	(61)	(11.9)	18.8	24.6	(5.8)
1975-76	16.5	(82)	15.5	(40)	1.0	3.7	(18)	23.3	(60)	(19.6)	20.2	38.8	(18.6)
1976-77	18.9	(83)	14.3	(44)	4.6	3.8	(17)	18.3	(56)	(14.5)	22.7	32.6	(9.9)
1977-78	22.5	(85)	10.3	(40)	12.2	4.1	(15)	15.5	(60)	(11.4)	26.6	25.8	0.8
1978-79	23.7	(56)	11.8	(44)	11.9	18.3	(44)	15.1	(56)	3.2	42.0	26.9	15.1
1979-80	26.1	(55)	12.7	(43)	13.4	21.3	(45)	16.8	(57)	4.5	47.4	29.5	17.9
1980-81	23.2	(50)	12.5	(40)	10.7	23.6	(50)	18.7	(60)	4.9	46.8	31.2	15.6
1981-82	24.8	(52)	14.2	(43)	10.6	23.1	(48)	18.8	(57)	4.3	47.9	33.0	14.9
1982-83	23.7	(49)	14.9	(43)	8.8	24.5	(51)	19.8	(57)	4.7	48.2	34.7	13.5

Source: The Seaway Authority, 1952 — 1982-1983 Annual Reports.

structure. There is cause to look into the possibility of standardizing and simplifying the user charges on the Seaway while ensuring that the constraints are more equally distributed.

In this respect, a new philosophy or approach is developing in certain circles: should user charges on the Seaway not be reduced or eliminated entirely?

Phrased in these terms, the question brings us back to a major problem: maintaining a strong competitive position on the St. Lawrence and the Great Lakes even though it is difficult to see the interest for Canada in operating at a loss. Canada is even less interested in operating at a loss since it is already responsible for maintaining, improving and administering 13 of the 15 locks on the Seaway and it serves a large volume of American traffic. Should this situation be remedied by imposing a rate structure that penalizes maritime transportation even further as compared with rail or road transportation? Should it be remedied by imposing tariffs that create greater constraints for the Québec economy and region than for Ontario or the Maritime provinces? Is it possible to find just solutions that do not take the American situation into account, since in many respects, the St. Lawrence and the Great Lakes are competing with American waterways, particularly the Mississippi where user charges are minimal?

In short, user charges, as well as the conditions necessary for fair competition in maritime transportation and between carriers of all kinds, and the consequences of user charges for the

Table 72

Total Revenue and Traffic in the Seaway, 1959-1982
(in current Canadian dollars and tonnes)

	Montréal-Lake Ontario				Welland Canal					
	Traffic	(%)	Revenue	(%)	Traffic	(%)	Revenue	(%)	Total Traffic	
1959	18 463 072	(43)	7 360 057	(80)	24 636 186	(57)	1 854 417	(20)	43 099 258	9 214 474
1960	18 425 545	(41)	7 300 000	(78)	26 535 317	(59)	2 100 000	(22)	44 960 862	9 400 000
1961	21 244 555	(43)	8 200 000	(79)	28 535 796	(57)	2 200 000	(21)	49 780 351	10 400 000
1962	23 218 514	(42)	9 100 000	(87)	32 120 599	(58)	1 400 000	(13)	55 339 113	10 500 000
1963	28 071 389	(43)	11 265 749	(94)	37 470 515	(57)	779 474	(6)	65 541 904	12 045 223
1964	35 661 150	(43)	14 108 612	(94)	46 619 657	(57)	941 495	(6)	82 280 807	15 050 107
1965	39 356 933	(45)	16 050 504	(95)	48 462 785	(55)	797 667	(5)	87 819 718	16 848 171
1966	44 679 017	(45)	18 333 014	(95)	53 771 255	(55)	1 063 104	(5)	98 450 272	19 396 118
1967	39 942 779	(45)	17 290 813	(89)	47 908 699	(55)	2 093 949	(11)	87 851 478	19 384 762
1968	43 503 732	(45)	19 347 700	(88)	52 685 380	(55)	2 703 323	(12)	96 189 112	22 051 023
1969	37 207 936	(43)	16 848 028	(82)	48 564 534	(57)	3 753 242	(18)	85 772 470	20 601 270
1970	46 397 081	(45)	19 956 995	(81)	57 034 672	(55)	4 743 038	(19)	103 431 753	24 700 033
1971	48 034 717	(46)	22 188 382	(80)	57 071 310	(54)	5 603 153	(20)	105 106 027	27 791 535
1972	48 607 720	(46)	21 399 077	(78)	58 147 326	(54)	5 984 527	(22)	106 755 046	27 383 604
1973	52 285 688	(46)	22 162 889	(78)	60 959 016	(54)	6 232 487	(22)	113 244 704	28 395 376
1974	40 049 653	(46)	17 645 200	(77)	47 500 956	(54)	5 366 741	(23)	87 550 609	23 011 941
1975[1]	43 555 037	(45)	19 068 490	(76)	54 295 035	(55)	6 007 990	(24)	97 850 072	25 076 480
1976	49 349 271	(46)	21 600 619	(79)	58 387 571	(54)	5 812 783	(21)	107 736 842	27 413 402
1977	57 457 309	(47)	25 669 556	(82)	65 078 544	(53)	5 722 104	(18)	122 535 853	31 391 660
1978	56 942 680	(46)	25 865 445	(54)	64 670 992	(54)	22 110 151	(46)	121 613 672	47 975 596
1979	55 322 093	(46)	29 012 859	(53)	66 164 546	(54)	25 908 937	(47)	121 486 639	54 921 796
1980	49 454 109	(45)	26 728 835	(48)	59 605 981	(55)	29 372 884	(52)	109 060 090	50 101 719
1981	50 569 251	(46)	28 927 747	(50)	58 850 875	(54)	29 148 748	(50)	109 420 126	58 076 495
1982	42 815 314	(47)	28 005 185	(48)	49 024 104	(53)	30 134 395	(52)	91 839 418	58 139 580

1 As of 1975, the results of the fiscal year were compiled from April 1 to March 31. The revenue cited for 1975 and subsequent years therefore corresponds to 1975-1976, and so on.

Source: The Seaway Authority , 1952-1982 Annual Reports. The Seaway; Operations, Forecasts, Statistics 1952-1982.

economy of the various regions, should be reviewed and adapted when faced with situations such as the one under discussion. Moreover, this should be done keeping in mind the role of maritime transportation in the economy.

Having brought up operating and maintenance costs as well as the cost of user charges on the Seaway, we would like to focus on the economic impact of maritime transportation in the St. Lawrence-Great Lakes system, particularly on employment in the transport sector.

At the outset, if the percentage of the R.D.P., the percentage of salaries paid and the percentage of employment attributable to transportation are any indication, transportation in general holds a relatively important position, in Canada and in Québec (see Table 73).

Table 73

Economic Impact of Transportation in Canada and in Québec, 1980

	Canada	Québec
a. as a percentage of the R.D.P.	5.43	5.60
b. as a percentage of salaries	6.58	6.94
c. as a percentage of employment	8.64	9.40

Source: Calculations based on *Statistics Canada* No. 13201 and No. 72002 and *Comptes économiques des revenus et dépenses*, 1961-1980, B.S.Q., Gouvernement du Québec.

It will be noted that, whatever the parameter, the percentage is always higher in Québec than in Canada. What is the situation for maritime transportation alone, which accounts at present for about 10 % of the contribution of transportation to the Canadian real domestic product (see Table 74)?

Of the 30 000 or so marine jobs in Canada in 1981, about 24 500 were related to carriers and called for about $769 117 000 in wages and wage-related benefits, as shown in Table 75.

Looking only at the fact that Québec, over the past ten years, has been the source, on an average, of about 35 % of Canadian maritime traffic, it is astonishing to note that Quebecers account for only 14 % of the labour force and 15 % of the wages paid in Canada. The province of Ontario, which contributes 26 % of the traffic, has 37 % of the jobs. More specifically, Québec supplies only 16 % of the crew members compared to 35 % in Ontario, and 11 % of the administrative positions, compared to 65 % in Ontario.

In Québec, the major ports employ about 8 000 people, including some 1 500 stevedores. The total annual payroll for these jobs is over $200 million. The distribution in 1983 is depicted in Table 76.

Still in Québec, the Seaway Authority posted 384 (34 %) of its 1 122 employees to the Montréal-Lake Ontario section. In 1982, the Laurentian Pilotage Authority used the services of 250 pilots and brought in $24 million, while the Great Lakes Pilotage Authority brought in an additional $8 million with its 153 employees. The Canadian Coast Guard has 1 400 employees in the Laurentian region and spends about $80 million annually in wages, supplies, services and various works.

These are the principal figures related to maritime employment. Of course, the economic impact of the maritime industry goes far beyond the jobs and wages of the employees mentioned above. Recent studies reveal the full scope of the industry.

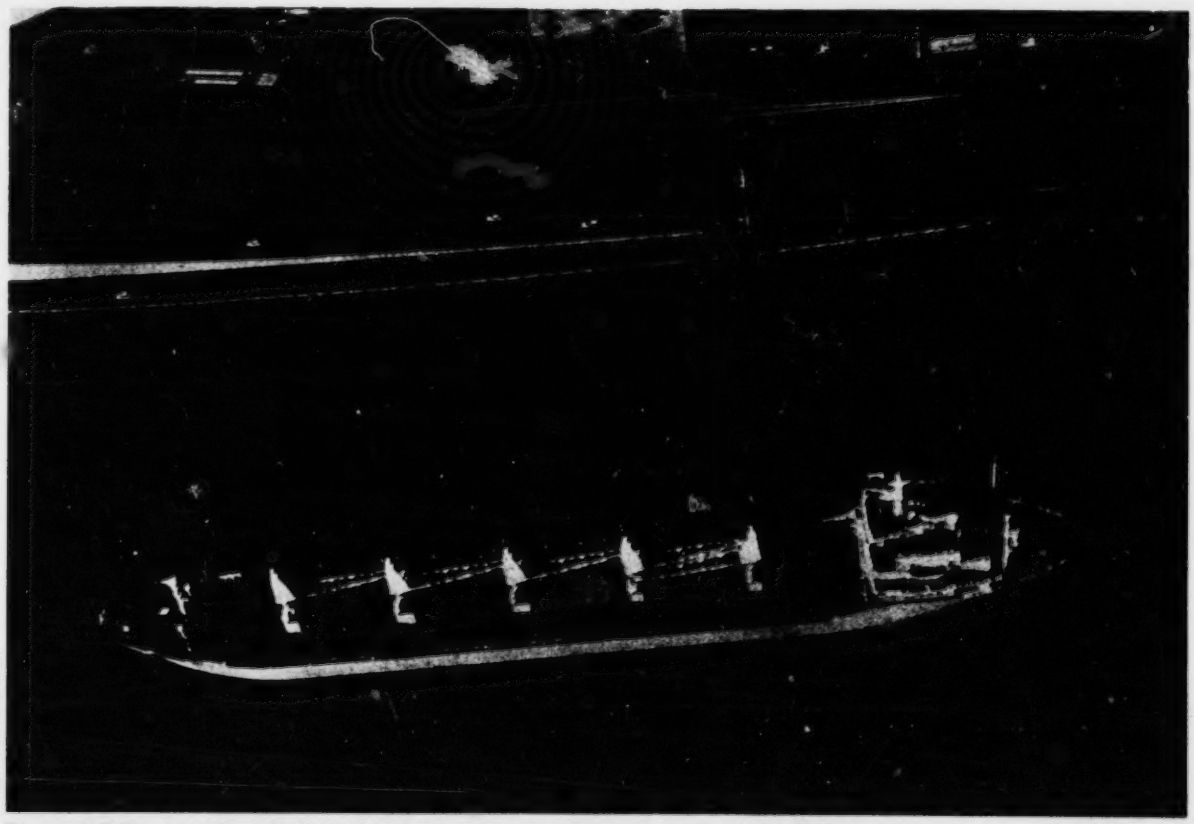
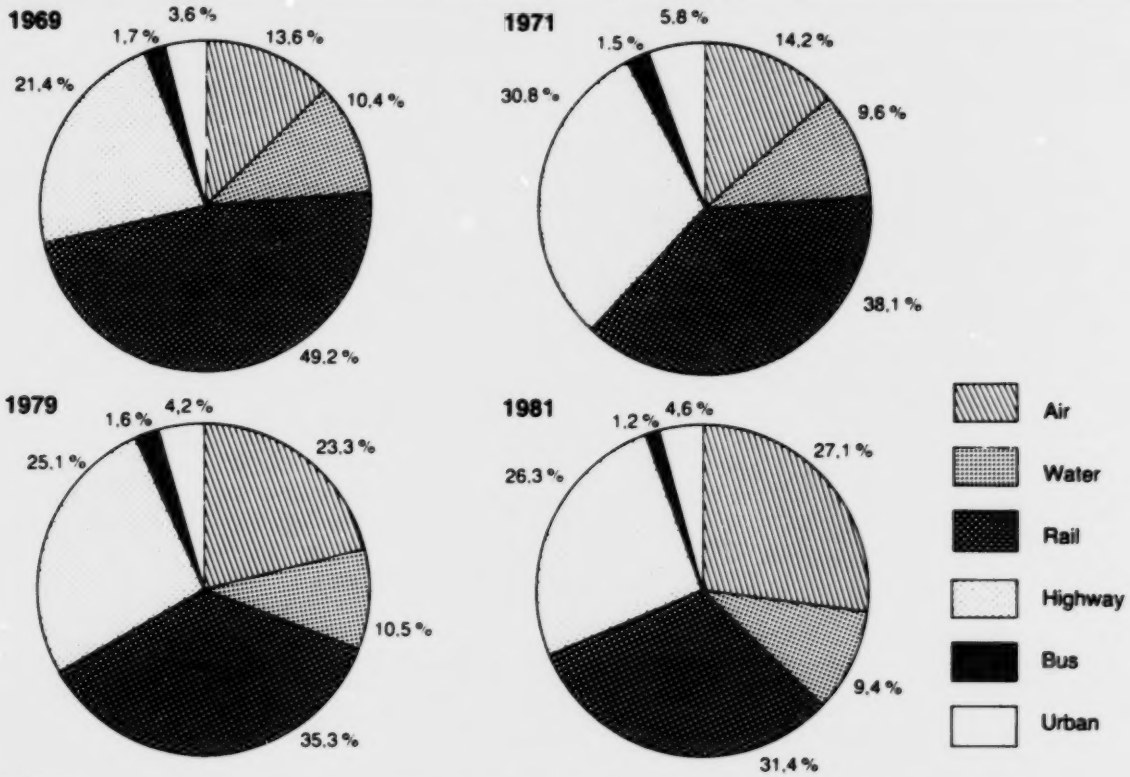


Photo: John Hutchinson

The possibility is being studied of reducing fees imposed on users of the Seaway.

Table 74

Transport Output by Mode in Terms of Real Value Added, 1969 to 1981



Source: Canadian Transport Commission, *Transport Review — Trends and selected issues*, 1981, p. 15 and 1983, p. 11.

Table 75

Number of Employees, Wages, Salaries and Benefits, for Ontario, Québec and Canada, Generated by Water Carriers, 1981

	Vessel Crew	Dock and Warehouse	Office and Administration	Other	Total
Québec 1981					
Number of employees	3 083 (16 %)[1]	506 (14 %)	755 (11 %)	115 (8 %)	4 459 (14 %)
Salaries, wages and benefits	$84 972 081 18 %	$9 771 268 12 %	$20 526 721 11 %	$2 375 661 6 %	$117 645 731 15 %
By employee	$27 561	$19 311	$27 188	$20 658	$26 383
Ontario 1981					
Number of employees	6 726 (35 %)	97 (3 %)	4 521 (65 %)	261 (17 %)	11 605 (37 %)
Salaries, wages and benefits	$155 547 985 34 %	$1 290 808 2 %	$123 754 348 65 %	$5 002 466 14 %	$285 595 607 37 %
By employee	$23 125	$13 307	$27 372	$19 167	$24 609
Canada 1981					
Number of employees	19 320	3 561	6 988	1 515	31 384
Salaries, wages and benefits	$464 285 806	$78 356 350	$189 718 715	$36 756 030	$769 116 901
By employee	$24 031	$22 004	$27 149	$24 261	$24 507

Source: Statistics Canada, Catalogue 54-205, 1981.

1 % of Canadian total.

The most comprehensive study seems to be the *Economic Impact of the U.S. Port Industry, An Input-Output Analysis of Waterborne Transportation* produced by the Maritime Administration of the U.S. Department of Commerce.

The purpose of the study was to provide a valid instrument for assessing the economic impact of the policies relating to the U.S. port industry. Leontief's input-output model was used to show, in quantifiable terms, how the port industry is economically linked with every other sector of the economy.

For the first time, the study gave a comprehensive definition of the port industry: "Any economic activity that is directly needed in the movement of waterborne cargo". The industry is analysed not only as a producer of services but also as a consumer of goods and services. The study endeavoured to discern the impact of the American port industry on jobs, income and tax revenues, as well as its impact on other industries. Its major findings may be summarized as follows. The American port industry is an important part of the national economy, not only because of its strategic role in assuring the flow of cargoes, but also because of the chain of economic activity that it generates. The effects of the port industry on the economy in terms of sales, purchases, income, jobs and taxes compares advantageously with other industries.

Table 76

Port Manpower and Total Payroll in Québec in 1983[1]

Port	Manpower	Total Payroll
Valleyfield	58	1 200 000
Montréal	3 600	100 000 000
Sorel	129	3 684 000
Trois-Rivières	400	9 000 000
Bécancour	50	1 500 000
Québec	1 800	39 800 000
Pointe-au-Pic	50	495 000
Chicoutimi	39	835 908
Baie-des-Ha! Ha!	450	16 000 000
Baie-Comeau	234	4 600 000
Port-Cartier	315	9 796 000
Sept-Îles	341	10 817 000
Havre-Saint-Pierre	34	687 000
Gros-Cacouna	15[2]	136 000
Rimouski	108[2]	1 400 000
Matane	91[2]	860 000
Cogema	15	625 000
S.T.Q.	366	11 000 000
Total	**8 095**	**212 435 908**

1 Office and dock personnel whose job is directly related to maritime operations.

2 Most of these are part-time positions.

Source: Table based on a telephone survey of port officials carried out by the St. Lawrence Task Force in the fall of 1983.

The study shows that, in 1970, the port industry had the following direct or indirect repercussions in the United States:

— Gross sales (revenues): $28 billion

— A $15 billion contribution to the GNP, which reached $985 billion that year

— Personal income: $9.6 billion

— Business income: $3.7 billion

— Federal taxes: $5.2 billion

— State and local taxes: $2.0 billion.

The study also revealed the following:

— The multiple purchases of the port industry for port operations have a multiplier effect of 1.6.

— The movement of each ton of waterborne cargo in foreign trade generated direct port industry revenues of $34. Applying the multiplier effect, the direct and indirect revenues amounted to $55.

— The movement of every 600 long tons in waterborne foreign trade created one job in the national economy.

— Every million-dollar increase in imports brought about an average increase of $229 000 in demand for port services.

— Every million-dollar increase in exports required an average increase of $160 000 in port services.

— Direct purchases of goods and services by the port industry from other industries totalled $8.9 billion.

— The direct and indirect impact of port investment totalled $2.1 billion.

André Graillot, assistant director of ports and shipping for the French ministère de la Mer, recently made some pertinent comments on this subject. During the international symposium, "Commerce and Navigation during winter on the St. Lawrence River", held in Québec City from February 6 to February 8, 1985, Mr. Graillot stated that, in France, it is presumed that one tonne of bulk cargo generates $2US to $3US in value added while in port and much more, $5US in France, for example, while on domestic waterways — a total value added comparable to that of maritime transportation.

Similarily, one tonne of containerized general cargo generates $6 per tonne while in port and $15 to $45 per tonne while in transit inside the European continent. Non-containerized general cargo is of still greater interest to a port.[1]

Closer to Québec, in 1980, Joan Baker[2] established that the number of jobs directly related to the Port of Montréal totalled 10 560, with a total payroll of $215 million and expenditure for goods and services amounting to $132 million.

A similar study on the Port of Québec[3] by the Bureau de consultation en gestion of Université Laval refers to 3 108 direct jobs created and a corresponding total payroll of $71 615 000. According to this study, the total impact (direct and indirect) of the Port of Québec amounts to 7 350 jobs, $138 million in wages, $685 million in value added and $1 450 million in sales. The Québec government collected $24 million in taxes while the federal government received $17 million.

It is worth restating that the economic impact of a port goes far beyond its direct effects on jobs and on the purchase of goods and services. Because of its role as a gateway, a port facilitates the growth of local industries by ensuring that they will find accessible markets at reasonable costs. On the other hand, because of the often gigantic size of new industrial developments that require direct access to maritime transportation, industrial port zones raise the question of land development. Since it has jurisdiction over land development, the Québec government must therefore take an interest in port development. Moreover, the big ports attract commercial activities that extend far beyond the immediate region. Expertise in the customs or banking sector, for instance, can give rise to a real growth service sector specializing in maritime transport that would rapidly find its place in the world of international trade. This is true in Montréal where numerous jobs have been created, as well as indirect benefits for related industries such as import-export firms.

For this very reason, it has been suggested that free zones be established in Québec. This appears to be a very interesting idea, but the opinion of Mr. Raynold Langlois, president of the Montréal Corporation for Port Promotion must be kept in mind. According to Mr. Langlois, the Corporation believes that legislation must be passed at both the federal and provincial levels to make it possible to create a real free zone in Montréal to serve the interests of both Montréal's seaport and its airport. He specifies that the Corporation's concept of a free zone goes beyond the traditional concept in favour of real zones where firms would have a special status not only as regards customs duties but as regards all other forms of taxation as well.

To come back to the economic impact, the St. Lawrence Task Force, in an effort to gather data more directly related to the Québec economy, looked into the economic consequences of an increase in shipping on the St. Lawrence and the Great lakes. It had three studies carried out in 1983, which were in fact three aspects of the same subject:

— Les Consultation économiques Martin Inc., (1983), *Impact sur l'économie québécoise d'une augmentation de trafic maritime dans le système Grands Lacs/Saint-Laurent (à l'aide du modèle intersectoriel du B.S.Q.)*, Montréal, 77 pages.

— Martin, Gilbert, in collaboration with Janelle Beaumont and Ghislaine Chamberland, (1983), *Étude d'impact économique pour le Québec d'une augmentation du traffic maritime dans le système Grands Lacs/Saint-Laurent*, Québec City, Bureau de la Statistique du Québec, Direction des études et synthèses quantitatives, 26 pages.

— Côté, Jocelyn, in collaboration with Denise Cloutier and Jude Zulu, (1983), *Étude d'impact économique de quelques scénarios d'augmentation de trafic maritime dans le système Grands Lacs/Saint-Laurent*, Québec City, Bureau de la Statistique du Québec, Direction des études et synthèses quantitatives, 39 pages.

It was known from the outset that an increase in the traffic in the St. Lawrence-Great Lakes system could have various effects on the Québec economy, both because of the increased activity of the carriers, particularly the carriers domiciled in Québec, and because of

1 GRAILLOT, André, (1985), "Bilan et promesses du commerce maritime entre les ports laurentiens et les ports français", to appear in the proceedings of the international symposium held in Québec City, February 6-8.

2 BAKER, Joan, (1980), *Impact économique direct, port de Montréal*, Office de l'expansion économique, Communauté urbaine de Montréal.

3 Bureau de Consultation en Gestion, (1981), *Étude de l'impact économique du port de Québec*, Université Laval.

Table 77

Direct and Indirect Effects on the Québec Economy of a General Increase in Maritime Traffic of 1 % a Year for 10 Years (1990), or an Annual Increase of 2 % for 5 years (1985) in the St. Lawrence-Great Lakes Artery and the Québec Ports
(in thousands of 1980 dollars)

	Direct Effect	Indirect Effect	Total Effect
Goods and services	86 197	54 583	140 780
Salaries	32 839	22 944	55 783
Other gross revenue	35 768	20 483	56 251
Total	**154 804**	**98 010**	**252 814**
Jobs	1 532	1 252	2 784

Source: — Les Consultations économiques Martin Inc., *op. cit.*
— Martin et al., *op. cit.*
— Côté et al., *op. cit.*

the activity of the firms supplying auxiliary services to maritime carriers. It was therefore important to refer to the appropriate models to evaluate the induced, direct, or indirect effects.

In these tables, the direct and indirect effects were estimated using the "INTERSECTORIEL" model of the Bureau de la statistique du Québec (B.S.Q.), while the induced effects were estimated using the "CHOIX" model of the same office. The increases in traffic which served to define the problem correspond to the difference between the volume carried in the ports of the St. Lawrence in 1980 and the volume expected in 1990. Taking into account the uncertainty of future coal demand, the main differences are as follows:

— 6 million tonnes of grain;

— 8 million tonnes of coal;

— 1 million tonnes of iron ore;

— 1.7 million tonnes of containerized cargo.

In summary, the studies in question highlighted the direct and indirect effects reported in Table 77.

If growth equals 1 % per year over 10 years, 278 jobs will be created each year. If growth equals 2 % per year over five years, 557 additional jobs will be created each year.

Although the model used does not allow for a direct calculation of all the induced effects, in the study done with the model, an effort was made to measure the sectorial distribution of activity and resources in manpower (jobs in man-years) and capital (investment) brought about as a direct, indirect or induced result of the increases. It is estimated that the increase in maritime traffic assumed for the purposes of the study would add a total of 5 000 new jobs to the economy by the end of the period. The number of jobs could go as high as 6 800 if the forecasts for traffic used earlier in this study were to prove correct.

1.6 Conclusion

So ends our overview of that great international trade route, the St. Lawrence River. We will complete it by examining, in a second section, the environmental, cultural and tourist aspects of the St. Lawrence. It must be remembered that the purpose of this report is to gather together the elements required to obtain a general idea of the situation and initiate renewed action. Many elements that deserved in-depth treatment have been summarily dealt with; this is the direct result of the delay in undertaking many of the studies required. In the opinion of the authors of the report, at this point in the action taken by the government and the St. Lawrence Task Force, the weaknesses are as nothing compared with the work accomplished so far in developing a major maritime transport and trade route. This is the source of the greatest motivation for assuming increased responsibilities.

Québec has inherited a very special geographical position. It has participated actively in maritime trade and its development on the St. Lawrence. Its economy is directly affected by any major upheaval in the maritime economy. The present situation calls for planning, cooperation and action. But the St. Lawrence is more than a trade route. Before proposing new directions, we must look at other related spheres of responsibility.

PART TWO

The St. Lawrence as a Place to Live

Photo: Gouvernement du Québec

Eighty per cent of the people of Québec live along the shores of the River, in a reservoir of varied resources.

Interested though we may be in development of the St. Lawrence as a major maritime transport route and as a favoured area for industrial and commercial activities, we must never lose sight of the fact that the River and its shores offer a wealth of resources and provide a home for 80 % of the people of Québec. These aspects of the River and its shores are equally important for the welfare of Quebecers and must be developed along the same lines as trade and transportation. These two major features complement each other, and must be developed in a coordinated manner; each can create a major economic impact.

To speak of the St. Lawrence as a place to live is to speak both of the natural resources which the River contains and nourishes and of the ways of life it has created since the beginning for most of the people of Québec, who live along its shores. Maritime activities, after all, were not modernized so very long ago, and consequently the people of Québec have not completely forgotten their traditional maritime culture. What cannot be denied, however, is that in the fifties there was a break. Progressively, the River fell into the hands of businesspeople, industrialists, professional seafarers, port labourers and specialized institutions — to the point that in truth the maritime economy no longer constituted a vast sphere of both collective and individual responsibilities. Action became sporadic, or was concentrated on specific areas, and more or less well integrated into the general economy.

This imbalance could not last. All kinds of economic problems led to concerns about employment in shipyards, about international trade, and about harbours and coastal trade. As

interest revived, a number of new questions arose: questions related to the quality of the water and of the environment, to the flora and fauna, to tourism and pleasure boating, to heritage and culture, to hydroelectricity and commercial fishing: so many aspects of the St. Lawrence, and so many activities which must be considered if the St. Lawrence and its commercial or economic functions are to be developed globally. For no one can close his or her eyes to these indissociable facets of the River. It has already been proven that while a division of tasks is indispensable to any industrial society, once the reasons for this division are lost from sight, the result can be out-and-out sterile conflict. This is not to say that responsibilities must be confounded, or that anyone should try to do everything at once. Far from it. Rather, it bespeaks organized action and concerted effort.

While we want to see people become aware of the benefits of a maritime economy in Québec and of the great assets we possess, we also want to see the renewal embarked upon with as clear a view as possible of all the advantages and responsibilities related to the St. Lawrence. In the same spirit which pervaded Part One of this report, we shall now attempt to examine questions related to the water and environment of the St. Lawrence, to hydroelectricity, to culture, tourism and recreation, and to commercial fishing: all major areas of potential.

2.1 The water: Rich in Quantity, Poor in Quality

The St. Lawrence is the outlet of an inland sea made up of the five Great Lakes. This inland sea measures 245 000 square kilometres, and its average flow at the Lake Ontario outlet is 6 860 cubic metres per second. The St. Lawrence also receives water from major tributaries: the Ottawa, the Richelieu, the Saint-Maurice and the Saguenay. The tributaries combine to produce some 30 % of the average total flow at Québec City, amounting to some 10 000 cubic metres per second.

The River is tidal as far west as lac Saint-Pierre, although the force of the tides is greatest between the Québec Bridge and the Saguenay, where they sometimes rise as high as 6.5 metres.

2.1.1 Quantity and Flow

Maintenance of the water flow is important not only for navigation, but also for the people of the municipalities who draw their drinking water from the River. Of the total population, 38 %, or some 2 400 000 people, fall into this category.[1] That this flow will remain constant is assured by regulating works governed by the International Joint Commission, or by the Ottawa River Planning and Control Committee (Québec — Ontario — Canada).

Three phenomena are attracting increasing attention to water volume: the consumption of water by the people and industries along the Great Lakes, possible diversions of appreciable volumes of water from the Great Lakes basin to other basins, and climatic changes which could reduce the present flow. The question has already been given detailed study by the International Joint Commission,[2] which has reached the following conclusions: between 1975 and 2035, water consumption should rise from 140 to 720 cubic metres per second, and this could reduce the average flow of the St. Lawrence by some 9 % at Cornwall, where it enters Québec. About 80 % of this consumption would take place on the American side. The fact strikes home even more when one considers that during low-water period, 90 % of the flow between Montréal and lac Saint-Pierre comes from the Great Lakes.

The largest diversion removes 90 cubic metres of water per second from Lake Michigan, at Chicago: the equivalent of 7.5 billion litres a day are diverted to the Mississippi. Moreover, it can be forecast that by the end of the century, the water crisis in the United States and the Canadian West may well become serious. Water needs for human consumption and for the development of agriculture and industry are growing rapidly, and can no longer be met by underground water, even less by surface water. While as yet there are no firm plans to this end, it can safely be forecast that pressure can only grow in favour of diverting part of the Great Lakes toward these regions.

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1 Information from the Service des eaux de surface, ministère de l'Environnement, Québec.

2 International Joint Commission (1981), *Great Lakes diversions and consumptive uses*: Executive summary of the report to the International Joint Commission by the International Great Lakes Diversions and Consumptive Uses Study Board.

With regard to climatic conditions, studies by the Atmospheric Environment Service (Environment Canada) and the National Oceanographic and Atmospheric Administration (NOAA) (United States) indicate a probable diminution of 21 % in relation to present figures for downstream flow — a decrease which would add to the nine per cent flow reduction resulting from consumption and diversions.[1]

Some of the American States along the Great Lakes (Michigan in particular) would rather see population groups and industries settle in the Great Lakes region than water diverted southwards. Should they have their way, Great Lakes water consumption could increase to the detriment of the people of Québec downstream. In this context, Québec signed the Great Lakes Charter on February 11, 1985: a charter endorsed also by Ontario and by the eight American states bordering the Great Lakes. This document calls for regional supervision of all additional diversions or of any notable increase in consumption in the jurisdictions concerned.

Along the same lines, but closer to home, Mr. Charles A. Langlois, President of the Chambre de commerce de la province de Québec, recently wrote to us that:

> It is already known that the United States have a great need for water, and will probably be asking that ever-increasing volumes of water be diverted from the Great Lakes southward. Any plans and agreements to this effect must be carefully watched, with an eye for our own water requirements for electricity and other needs.

Finally, some areas of private enterprise are looking at the Kierans Project (named for its principal promoter, Thomas Kierans). This project would involve separating James Bay from Hudson's Bay by means of a dam, pumping the fresh water from the lake so formed, and diverting that water southward toward the Great Lakes.

There is no doubt that any significant, permanent reduction in the flow of the St. Lawrence will have a negative economic impact on Québec: a drop in the hydroelectric potential, navigation problems, higher dredging costs (and increased related pollution), diminution of the River's power to purify itself, drying up of swampland, shallower water at wharves and marinas. Québec should follow the example set by Ontario and keep abreast of developments in this area, while at the same time becoming more interested in what the international committees and commissions are doing.

Again in the matter of water flow, Québec's general flood plains policy was drawn up on the strength of government policy to restrict development in flood zones. The approach is founded on the principle of two flood zones where water overflows. The first, or fast-flow, zone, extends from the shore to where the water reaches its height every twenty years. The second, or slow-flow, zone, begins where the first ends, and extends to where the water may reach its height every hundred years. This general principle has been made known by the federal and provincial governments both to their various agencies and to municipal authorities through a federal-provincial agreement on flood plains cartography with a view to reducing damage. This agreement was recently renewed until 1987. The maps involved show fast and slow-flow zones for a series of municipalities. In addition to having charge of this mapping program, and to being a member of the federal-provincial committee responsible for the agreement, Québec's ministère de l'Environnement has developed standards for application and prevention intended to provide better supervision of construction in the flood zone, and thus to eliminate material damage and ensure safety for residents.

2.1.2 Quality

Nevertheless, any potential use of the water of the St. Lawrence would be far more greatly affected by a drop in the quality of that water than by any reduction in its quantity. More than thirty Québec municipalities, containing some 38 % of the province's population, draw their drinking-water from the St. Lawrence. In 1977, the federal-provincial Study Committee on the St. Lawrence indentified six major problems in the River's water:

— the presence of a number of toxic substances;

— bacteriological contamination;

— encroachment on the territory of biological resources;

— the abundance of solid matter in suspension;

1 BRUCE, J.P. (1984), *Futures in Water, Ontario Water Resources Conference*, Toronto, June 12-14, 1984, Environment Canada, 7 pp.

— excessive enrichment in nutrients;

— loss of esthetic value.[1]

The 1978 Report contained recommendations which covered everything from protection and enhancement of water quality, conservation of biological resources, protection of shorelines and use of residue from dredging, to purification of municipal wastewater and of industrial wastes. Another recommendation was to the effect that a federal-provincial coordination group be created to ensure implementation of these recommendations, although this group has never been set up.

Some groups and individuals, however, did take action in keeping with the recommendations. Québec, for instance, set up a water purification program, which concentrated on the three main sources of pollution: municipal waste water, industrial wastes and farm pollution. Action progressed logically, beginning upstream.

Urban communities, municipalities and industries alike are encouraged to equip themselves with the appropriate antipollution facilities. The program has occasionally been held up when groups of citizens have decided by referendum not to allow their elected representatives to take out a loan to pay what the ministère de l'Environnement has required of them. Other citizen groups have been deterred by subsequent operating costs for plants.

In the urban centres of Montréal, Trois-Rivières and Québec City, the accent until now has been laid on the construction or rehabilitation of collector networks, a phase that generally precedes construction of treatment plants. These plants are not yet operational, however, so the sewers still empty directly into the River.

By March, 1985, 598 municipalities had enrolled in the program; their commitments totalled $3.5 billion, representing 75 % of the total investment forecast for municipal urban water purification. To date, over $1.2 billion have been invested. Discussions have been held with the federal government of the possibility of a federal contribution under a federal-provincial auxiliary agreement. Be it recalled that Environment Canada has set as one of its objectives a direct and significant contribution to the restoration of the River.[2]

What of the industries? To date, 6 185 plants have been catalogued. Of these, 1 366 have been declared serious polluters; among the offenders, 618 have begun either work or negotiations with a view to setting a schedule for reduction of the pollution level. The effort at regulation has centred mainly on oil refineries, chlorine and caustic soda plants, and pulp and paper mills. Under agreements signed in March, 1985 by the federal government and the firms, the value of work begun or completed will reach $35 million.

Excluded from this, however, are the pulp and paper sector and the industries within the territory of the Communauté urbaine de Montréal (7 600 industries accounted for, of which 929 are recognized polluters). In its Regional Strategic Plan, the federal Department wrote that:

> The chemical industry, particularly in the organic chemistry sector, and the metallurgical industry, are responsible for the emission of a considerable number of pollutants, and such action as has been taken to date in this sector is very restricted. Most of these industries are located on the south shore of the St. Lawrence between Montréal and Trois-Rivières, in a region which for the moment is not a target for Québec's water purification program. Similarly, mining operations and ore processing are a source of pollution of the River's tributaries.[3]

Ottawa then made public its initial strategy on industrial wastes: to apply federal standards then in force wherever this was necessary. Its second such strategy would be to look into the possibility of instituting national modernization programs for the industrial sectors, with environmental restrictions integrated into the programs for assistance to industry. An example would be taken from the program for modernizing pulp and paper mills.

The pulp and paper mills, as is possibly well known, were the first to be pinpointed as very serious sources of water pollution. The program for modernizing these mills, which lasted from 1979 to 1984, was exemplary in that environmental requirements formed an integral part of it. The mills registered in the program invested over $100 million over the past year, which brought the total invested to $604 million, out of an estimated total of $957 million.

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1 Federal-Provincial Study Committee on the St. Lawrence (1978), *Report*, ministère de l'Environnement du Québec and Environment Canada, 293 pp.

2 Environment Canada, Québec Region (1983), *Regional Strategic Plan*.

3 Regional Strategic Plan, *Op. Cit.*, p. 20.

Table 78

Solids in Suspension in Certain Tributaries of the St. Lawrence[1]

River	Nicolet	La Pérade	Bécancour	Chaudière
Average annual flow of solids (in tonnes/day)	1 131	305	912	2 356
Maximum flow of solids at peak periods (tonnes/day)	20 444	10 990	14 944	54 000
Solids per year (in tonnes)	412 815	111 325	332 880	859 940

1 See FRENETTE, M. and VERRETTE, J.-L. (1976), "Environnement physique et dynamique du fleuve Saint-Laurent", *L'Ingénieur*, March-April 1976, pages 13 to 24.

Since investment requirements for elimination of pollution in the pulp and paper industry vastly exceed the amounts provided for in the modernization program, a new federal-provincial agreement should eventually be negotiated, and this time, significant stress should be laid on pollution reduction. Environment Canada's initiative could be profitably repeated in Québec's industry modernization programs — in other words, environmental objectives could be integrated into them with beneficial effect.

In the farming sector, efforts have been concentrated on management of manure, with a view to stopping direct pollution of watercourses. Success has been mitigated. In addition to these highly visible sources, however, there are also the more dispersed sources: equally, and perhaps even more, important. For more than 50 % of all farm pollution comes from cultivated areas where pesticides and surplus fertilizers are spread everywhere by drainage and soil erosion — as are the richer top layers of earth.

The problem is particularly serious where intensive culture is done: of corn, for instance, where, every year, even if the land is flat, some five tonnes of rich surface soil can be eroded from every hectare.[1] Moreover, by reason of their location along the St. Lawrence, farm lands have become and important contributor of river sediment, whose removal requires a major share of the dredging operations.

A number of needs, then, could be met by a policy for preservation of farm and forest land — since present forestry methods are also a major source of erosion.

1 U.S. Army Corps of Engineers (1983), *Summary Report of the Lake Erie Wastewater Management Study*, 30 pp.

The program for draining farm land is intended to remove surplus water from the land quickly. However, the digging and the rearranging of collector streams, which are then left exposed, eventually lead to unfortunate consequences for downstream waters, and by extension, for the St. Lawrence. Shores become sensitive to erosion, and much suspended matter is released. This erosion is speeded up when the snow melts or after a heavy rainfall. As will be seen in Table 78, the amount of solid matter in suspension can sometimes be considerable.

Frenette and Verrette estimate that 12 million tonnes of solids are carried past Montréal in the St. Lawrence every year, and 20 million tonnes past Québec City. Most of these solids begin their journey on farms, and when we consider the presence of pesticide and fertilizer residues, it becomes obvious that if the St. Lawrence is to be cleaned up, major efforts will be required of the farming sector, as well as of the municipalities and the industries.

The contribution made by the farms would be all the more beneficial since it would support agricultural zoning — not as useful if the fertile surface layer eventually finds its way to the St. Lawrence! For this reason, it becomes important to establish a soil conservation policy and make it known in the farming sector, and to consider cultivation without ploughing, and sodding the banks of collector streams.

Right now, Québec is engaged in improving shores, lakes and watercourses. The purpose is to clean up the shores and to protect them, making them more stable by planting grass and trees, building access roads, setting up light facilities and so on. This project has come at the right time.

2.1.3 Toxic Substances

Of all the pollution problems affecting the St. Lawrence, none is more critical than that caused by toxic or dangerous substances: elements such as cadmium, mercury and lead, and organic compounds such as mirex, dioxin and PCBs, to name a few.

Toxic substances are found in industrial effluent, in precipitation, in urban surface runoff, in urban effluent which has been badly treated, and in pesticide and herbicide residues. They become concentrated in sediment and later find their way into the food chain and into aquatic plants, mollusks and the flesh of fish where the degree of their concentration becomes so high that consumption of some species must be forbidden or, at the very least, severely restricted. What is most disconcerting is that the water treatment plants cannot eliminate these substances, and many Québec municipalities draw their drinking water from the River.

If it were possible to stop the flow of any more toxic substances into the St. Lawrence, natural sediment would gradually, over the years, cover the layers of sediment which are now polluted, thereby making them less accessible to fish and other organisms. But with only one dredging operation things could revert to the way they had been. It is most important to select dredging methods which will leave the smallest possible number of particles in suspension; it is also most important to dispose of the waste material where it cannot be carried back into the River.

Pollutants in the St. Lawrence tend to concentrate along the shores rather than in the shipping channel. And it is along the shores that the River's biological activity is concentrated. There, in the swamps and the shallow water, fish, batrachians, birds and mammals live and reproduce, as do insects, leeches and gastropods, on which other animals feed. It is also along the shores that the River can be developed for recreation; consider the beaches, launching ramps, wharves, marinas and other such facilities. As things stand now, most of the beaches from Montréal to below the Île d'Orléans have been closed to swimming, because of pollution. So the reasons are many for studying not only the various causes of pollution, but also their interrelations. For only if this study is done can remedies, to a great extent, be effective. Perhaps concerted action depends on a diagnosis stressing the interdependence of polluters and corrective measures.

Photo: Ministère du Loisir, de la Chasse et de la Pêche

Pollution is concentrated along the shores rather than in the ship channel; and it is along those same shores that biological activity is concentrated. Here also can be found means of access to recreational activities.

If the level of the St. Lawrence is to be maintained, and its waters cleaned up, this will involve difficult concerted work on the part of many. The St. Lawrence is the outlet for a vast, densely populated and industrialized basin, where farming and forestry operations are carried on at an intense rate. The St. Lawrence is directly affected by activities on the Great Lakes, and in Ontario and Québec. It comes as no surprise, then, that protective measures are many and, on the whole, poorly coordinated.

Under the aegis of the International Joint Commission, vast sums are spent each year on monitoring Great Lakes water quality and on remedying major pollution sources. Canada and Ontario take a continuing part in these programs. Until recently, Québec watched from a distance, even though management of the water in the Great Lakes directly affects both the flow and the quality of the water in the St. Lawrence. Québec did, however, take an active part on the Federal-Provincial Study Committee on the St. Lawrence, whose report was submitted in 1978. And Québec is now a member of the Tripartite (Canada-Ontario-Québec) Committee on the Ottawa. These committees have

proposed firm steps, and Québec has followed up on these to an extent, as witness the present water purification program through which Québec intends to reduce the spread of toxic substances, bacteriological contamination, excessive nutrients and sediments in suspension.

2.1.4 Habitats

On the other hand, the building of roads and harbours, the extension of private land and the draining of farm land imply continued encroachment on habitats especially suited to wildlife (rapids, swampland, shores and tidal flats). There can be no doubt that this encroachment constitutes a threat, for such measures add to the causes of pollution while they destroy areas essential to the survival of species. What is improved on the one hand is often destroyed on the other. Anyone who makes a brief study of the state of wildlife soon become convinced of the need to broaden concerns for water purification to apply to wildlife conservation, and to combine preventive measures with corrective ones. Contrary to what might be believed, recovery in one case does not necessarily lead to sufficient protection in the other. The gap is already wide between polluting agents and regenerating agents. If the gap is to be narrowed, efforts at regeneration must be combined.

A number of regenerating sites have already disappeared between Cornwall and cap Tourmente: the natural shores of the rivière des Prairies, for instance; the north shore of lac Saint-Louis; both shores of the Seaway above Montréal; the north shore between the Québec Bridge and the bridge to the Île d'Orléans...

True, Québec has carried out various studies and prepared detailed plans for the development of the entire zone between the Ontario border and Trois-Rivières.[1] And studies have also been made of the shores and islands of the St. Lawrence and of the Saguenay. But the implementation of these plans is progressing slowly.

Various private groups supported in particular by hunters of migratory birds — Ducks Unlimited and Duvetnor, to name two — are investing in the preservation of sites which are important to wildlife. Their approach appears most interesting and should certainly be encouraged by government. Contributions made to these non-profit foundations may be deducted for income-tax purposes. In this particular case, the investments are being made by interested people, not, as in the case of government investments, by the whole population, although the final result can be of benefit to a great many.

In recent years, the governments have acquired a considerable area of green space along the shores. The Canadian government has continued to buy more shoreline property, while the Québec government has bought Île Sainte-Thérèse and the Îles de Boucherville. The City of Montréal has made major purchases. Two sure methods of preserving the sites in question are purchase and expropriation, although this in turn begs a question: can such action, whether sporadic or systematic, effectively yield the results sought? And does it emphasize the problems of joint action in carrying out purification and conservation programs? As things stand today, sporadic action is by no means obviously suitable to comprehensive projects.

Mention must be made here of the preventive role played by the environment departments both of Canada and of Québec, which demand that whenever a major development project affects the shores or the bed of the St. Lawrence (dredging, or the building of a wharf), an analysis be made of the impact of that project on the environment. The principle of environment impact analysis first emerged in the United States in the early 1970s and is a good thing *per se*, since it compels the promoters of projects to give serious consideration to the repercussions their project will have on the environment.

It might be wise, however, to reevaluate some of the methods of application. Environment impact analysis would gain were it to be included within the broader process of planning socio-economic development and Québec land use. It would gain by being carried out as soon as a specific project is submitted; otherwise any preventive action may well become rapidly watered down in all manner of conflicts of jurisdiction or last-minute compromise.

The St. Lawrence, then, is vitally important as a body of water, and as a habitat for wildlife. Regrettably, its potential is diminished by all kinds of pollution: municipal, industrial, agricultural and atmospheric. To be sure, corrective

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1 OPDQ (1977), *Le Couloir fluvial entre Montréal et le lac Saint-Pierre.*

MLCP (1983), *Plan directeur pour la conservation et la mise en valeur de la région du lac Saint-Pierre.*

MLCP (1984), *Archipel de Montréal. Mise en valeur intégrée du milieu naturel et du loisir de plein air*, Projet Archipel.

and preventive action has been started here and there, but there is still no evidence of that joint effort sufficient to ensure swift, lasting progress. The various programs for developing agriculture, purifying water and protecting sites and habitats are not well coordinated, and like the governments, the various international, interprovincial, intermunicipal and private groups involved are acting more or less in isolation. The importance of the problems of pollution and development has been grasped, but this is not to say that effective joint action in corrective or preventive measures is any closer.

2.2 Wildlife: abundant, yet threatened

The St. Lawrence corridor constitutes an exceptional ecological system (ecosystem) which extends over six degrees of latitude. The degree of salinity of the River's water varies, from nil (fresh) to brackish to salty. These variations, along with climatic changes brought about by latitude, are responsible for the great diversity of the aquatic wildlife and shoreline vegetation.

Let the reader consider in addition the geomorphological variety of the shores of River and Gulf, the great number of islands, and the fact that the St. Lawrence corridor lies perpendicular to the flyways of eastern American birds, and he will have little difficulty in imagining the prime importance of this corridor for wildlife.

Despite the ecological harm done in recent decades by urbanization and industrialization, a number of wildlife habitats exist along the St. Lawrence. Among the more important zones of wildlife habitats are the rapids, the fresh-water marshes and bogs, the flood plains, the estuaries of the tributaries, the intertidal marshes in the estuary and the Gulf, and the islands and cliffs. Here wildlife reproduces, feeds and takes shelter from predators.

A recent study by Québec's ministère du Loisir, de la Chasse et de la Pêche emphasizes the importance of the St. Lawrence as a wildlife ecosystem.[1] This study shows that out of Québec's 674 species of vertebrates, 301 (45 %) live along the shores and 132 (20 %) live in deep water. In other words, 65 % of Québec vertebrates are associated with the two dominant milieus of the corridor.

1 Groupe de travail sur la protection des habitats (1982), *La protection des habitats fauniques du Québec*, ministère du Loisir, de la Chasse et de la Pêche, 337 pp.

2.2.1 Aquatic Wildlife

One hundred and twelve species of fish are associated with fresh water in Québec, and almost all of these are found in the St. Lawrence. Over fifty are not widely distributed, and live only between Cornwall and Québec City, and in the lower part of the tributaries. Ninety-eight of these species can be associated with the shoreline milieu: in the shallow coastal waters and in the marshes they reproduce, feed and protect themselves from predators. Some of these species, the pike for instance, venture onto the flood plains at peak flow, to lay their eggs. If the fry are to have enough time to become sufficiently strong to follow the receding water back to their permanent aquatic milieu, the flood will have to last a fairly long time. Thus, the flood plains of the Richelieu and Ottawa rivers, and of lac Saint-Pierre, have a primordial role to play in the reproduction of certain types of fish, and must, at all costs, be protected.

At the other extreme, most of Québec's 78 species of salt-water fish are more at ease in deep water, where the tides do not encourage use of the shores for reproduction. Still, the adults of several species come with the high tide to feed in the intertidal marshes.

One species is worthy of special attention: the Atlantic salmon. This species has a high commercial value, and is anadromous: it must swim up rivers to spawn in fresh water, then return to the sea to grow. Unlike a number of Pacific species which spawn only once and die on the spot, the Atlantic salmon can return to spawn in fresh water several times.

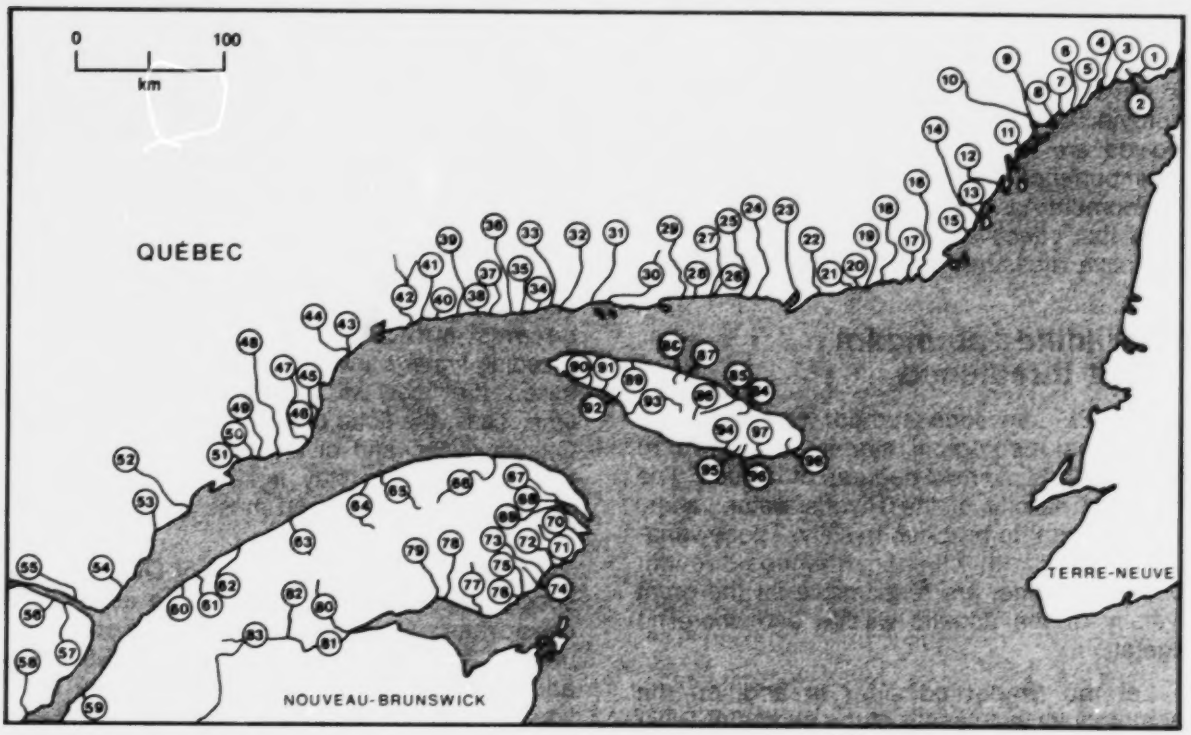
Québec has 102 salmon rivers, of which 98 are direct tributaries of the St. Lawrence and the Gulf. The map in Table 78 shows their location.

Wildlife: abundant, varied, and... threatened.

Photo: Ministère du Loisir, de la Chasse et de la Pêche

Table 79

Salmon Rivers



Rivers

1. Brador
2. des Belles Amours (stream)
3. au Saumon (stream)
4. Saint-Paul
5. du Vieux Fort
6. Napetipi
7. Chécatica
8. Coxipi
9. Saint-Augustin
10. Saint-Augustin Nord-Ouest
11. Kécarpoui
12. à la Baleine
13. du Gros Mécatina
14. du Petit Mécatina
15. Nétagamiou
16. Etamamiou
17. Coacoachou
18. Olomane
19. Washicoutai
20. Musquanousse
21. Musquaro
22. Kégashka
23. Natashquan
24. Aguanus
25. Nabisipi
26. Petite Watshishou
27. Watshishou
28. Piashti
29. de la Corneille
*30. Romaine
31. Mingan
32. Saint-Jean
33. Magpie
34. Jupitagon
35. au Tonnerre
36. Sheldrake
37. à la Chaloupe
38. aux Graines
39. au Bouleau
40. Pigou
41. Matamec (research, no line fishing)
42. Moisie
43. Dominique
*44. aux Rochers
45. du Calumet
46. Petite Trinité
47. de la Trinité
*48. Godbout
49. Franquelin
50. Mistassini
51. des Anglais
52. Betsiamites
*53. Laval
*54. des Escoumains
55. Sainte-Marguerite
56. Saint-Jean
57. Petit Saguenay
58. du Gouffre
59. Ouelle
*60. du Sud-Ouest
61. Rimouski
*62. Mitis
*63. Matane
*64. Cap-Chat
*65. Saint-Anne
*66. Madeleine
*67. Dartmouth
*68. York
*69. Saint-Jean
70. Malbaie
71. Grande Rivière
72. du Petit Pabos
73. du Grand Pabos
*74. du Grand Pabos Ouest
75. Port-Daniel
76. Petite Port-Daniel
77. Bonaventure
78. Petite Cascapédia
79. Cascapédia
*80. Matapédia
81. Restigouche
82. Patapédia
*83. Kedgwick
84. aux Saumons
85. Natiscotek
86. Vauréal
87. à la Patage
88. Mac Donald
89. à l'Huile
90. aux Becs-Scie
91. Sainte-Marie
92. à la Loutre
93. Jupiter
94. de la Chaloupe
95. Dauphine
96. Box (stream)
97. Bell
98. Seal

* Fish Sanctuary

Source: Chasse et Pêche Québec (1983), Ministère du Loisir, de la Chasse et de la Pêche.

There are some rivers which the salmon no longer use. The bottoms of those rivers have become clogged with bark and alluvion by reason of erosion and sedimentation brought about primarily by clear cutting and floating of timber. Dams create insurmountable obstacles and have lowered water levels below them, thereby thwarting the salmon's efforts. In recent years, action has been taken toward rehabilitating some rivers by cleaning them up, stocking them, and building fishways around obstacles. In this way the salmon have been brought back to the Jacques-Cartier. And once again, salmon are swimming up the St. Lawrence as far as Donnacona, although the River water is not yet very clean.

It has become essential to preserve the quality of the water and the spawning beds, and to guarantee the fish free access all along the productive rivers. If this is to be done, forest cover must be maintained along the slopes and the shores, to restrict the causes of erosion and sedimentation. The use of toxic chemicals must be avoided in the river basins; rivers should not be diverted, and fishways must be installed to help fish get around obstacles.

2.2.2 Bird Life

Almost half of Québec's birds can be found on the shores at one time or another. Over a hundred species nest there, while about fifty "pass through" during migration. Best represented, in numbers, are geese and ducks, shore birds, herons, seagulls and sea birds.

Not all of them use this milieu in the same way. Some, as has been seen, visit briefly on migration, stopping to rest and regain their strength. Others, the seabirds for instance, nest on dry land but spend the rest of the time on the water. Still others, like ducks, nest in the driest parts of the shore, and feed and take shelter in the coastal swamps and weeds.

During the spring and fall migrations, strong concentrations of birds can be found in certain zones along the flyways, where food is abundant. This is particularly true of geese and ducks, which are hunted each autumn along the whole River (a hunt which creates a major economic impact). Table 80 illustrates the abundance and distribution of ducks and geese at peak migration periods, between Cornwall and Rimouski.

Table 80

Ducks and Geese: Distribution at Migration Peaks

Sections	Abundance and Distribution	
	Spring	Autumn
Lac Saint-François	22 000 diving ducks*	41 000 diving ducks
Lac des-Deux-Montagnes	7 000 geese	29 000 sea ducks
Lac Saint-Louis	4 000 diving ducks	
	ducks	27 000 diving ducks
Montréal-Sorel	8 000 geese	
	diving ducks	11 000 dippers
Lac Saint-Pierre	174 000 geese	65 000 diving ducks
Lac Saint-Pierre — Grondines E.	9 000 geese	14 000 dippers
Grondines E. — Québec	10 000 geese	20 000 diving ducks
		dippers
Québec — Saint-Roch (Upper Estuary)	169 000 geese	224 000 geese
Saint-Roch — Trois-Pistoles (Middle Estuary)	81 000 geese	9 500 dippers
Trois-Pistoles — Rimouski (Lower Estuary)	9 800 sea ducks	9 500 sea ducks
		dippers

* Group representing at least 20 % of total ducks and geese at migration peak.

Source: LEHOUX, D., BOURGET, A., ROSA, J. (1977), *Importance du Saint-Laurent pour la sauvagine*, Environment Canada, Québec Region.

Photo: Jean Gagné

Photo: Ministère du Loisir, de la Chasse et de la Pêche

In spring and autumn shore birds also abound: some thirty different species invade the St. Lawrence corridor in groups of several thousands at a time.

Shoreline, then, both its dry and its wet parts, constitutes an essential habitat for almost half of Québec's birds. With thousands of kilometres of shoreline, and islands by the hundreds, the St. Lawrence has a strong concentration of this type of habitat.

2.2.3 Mammals

While a number of mammal species are found in the shoreline areas, only the muskrat is present in any significant numbers, although these numbers are difficult to count. The muskrat prefers the same type of habitat as ducks and geese. Between one hundred and fifty and two hundred thousand muskrats are captured each year in the river corridor, and bring the trappers between half a million and a million dollars.

The deep-water region of both the estuary and the Gulf are home to seven species of whale, from the beluga (actually one of the delphinidae) to the blue whale — the largest known mammal — and four species of seal. Québec is one of those rare regions in the world where the inland waters are regularly visited by cetaceans. They spend the summer and the autumn in the Gulf, where they find food and tranquility, and where they can bring up their young in peace. In recent years they have become a tourist attraction. The first whale-watching excursions were organized by the Société linnéenne de Québec, and attracted vacationing travellers from Québec, Ontario, the United States, and even overseas. As these excursions gain in popularity, an increasing number of people want to get their share, and questions are being asked about the consequences for the welfare of the whales themselves. Perhaps some control should be exercised in this regard.

2.2.4 The Parties Involved

The parties primarily involved with the wildlife sector are: for Québec, the ministère du Loisir, de la Chasse et de la Pêche (MLCP) and the ministère de l'Agriculture, des Pêcheries et de l'Alimentation (MAPA), and for Canada, Environment Canada (Canadian Wildlife Service) and Fisheries and Oceans Canada. The Direction générale de la faune in the MLCP is responsible for preserving and managing wildlife and its land and fresh-water habitat, while the Direction générale des Pêches maritimes in the MAPA deals with commercial maritime species (fish, crustaceans, mollusks and others).

Early in the 1960's, as part of the Canada Land Inventory, federal-provincial teams classified territories according to their most rational use: farming, forestry, recreation and wildlife conservation. In the last-mentioned case, particular attention was paid to two groups: migratory birds, and ungulates. The maps drawn at the time clearly point up the importance of the St. Lawrence corridor for ducks and geese. The Canadian Wildlife Service made more detailed studies of different types of wet shorelines, bird colonies, mollusk populations, and so on. There are now six federal wildlife preserves along the St. Lawrence: at lac Saint-François, the Îles de

la Paix, the Îles de Contrecoeur, cap Tourmente, Baie de l'Isle-verte and Pointe de l'Est. These territories were bought by the Canadian Wildlife Service and set up as preserves. The map in Table 81 shows their distribution in Québec.

In 1983, the federal government purchased the archipel de Mingan, with the intention of turning it into a park similar to other federal parks in Québec — Forillon and de la Mauricie.

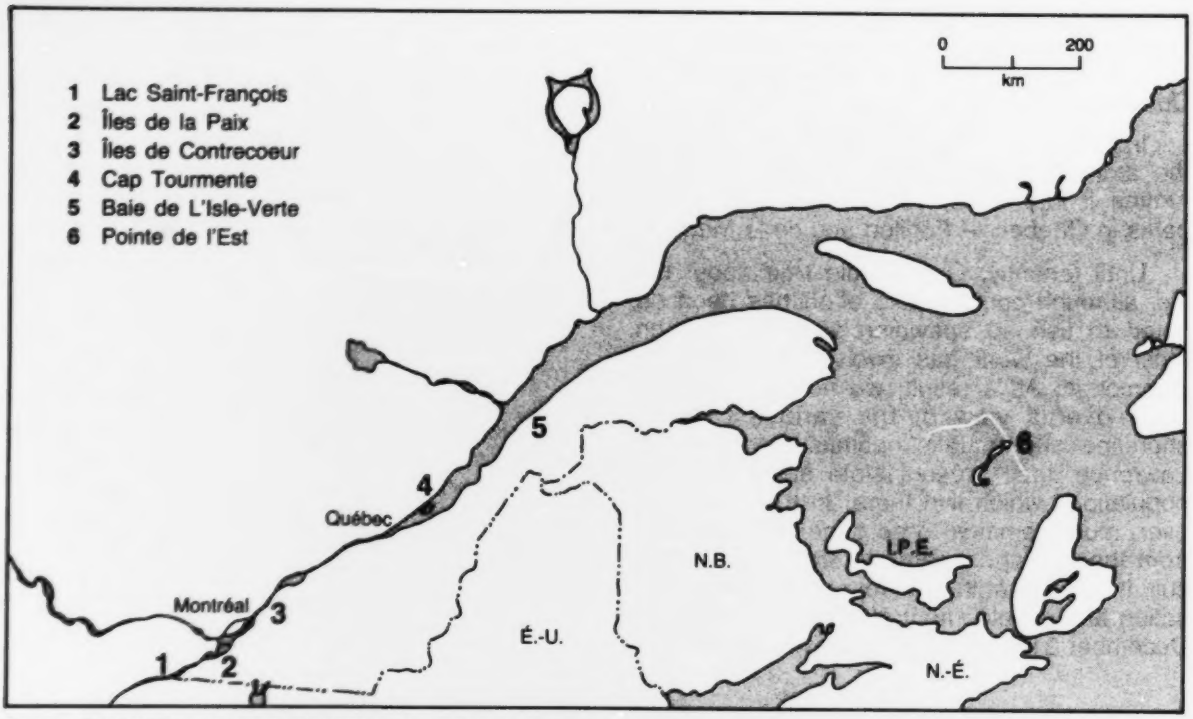
Until recently, Québec did little about bird life, although considerable effort has been devoted to fish, to spawning sites, and so on. Most of the work has involved research and inventories. As a result, we now have a very good overall view of the various types of shoreline and aquatic habitats along the St. Lawrence, their present state and the animal populations which live there. In the field, however, much remains to be done. The transition from theoretical concerns to firm action is difficult. It is true that the Act respecting the conservation and development of wildlife, assented to December 21, 1983, makes provision for a fund which actually may enjoy a bit of elbow room. At any rate, until now few Québec funds have been devoted to the conservation of wildlife habitats along the St. Lawrence.

To prepare an inventory of all the natural resources along the St. Lawrence is no easy task. These resources are precious, and concern for them is mounting; disturbing facts are being brought to light. Consider: 70 % of the shoreline between Cornwall and Québec City has been altered to the detriment of water quality and of wildlife habitats; no more than 48 000 hectares of marshland remain along the St. Lawrence. People, however, are becoming more aware of the responsibilities to be taken on. The preventive or corrective steps either planned or already being carried out are growing in number. If concern remains, it is doubtless founded on the length of time required to implement or coordinate such action, since the plans are constantly running into obstacles: too many people and agencies involved, conflicts of jurisdiction and opinion, financial requirements...

Photo: Société Linnéenne

Table 81

Wildlife Preserves



Source: RINGUET, I., de REPENTIGNY, L.-G. (1982), *Un profil des réserves nationales de faune au Québec*. Environment Canada, Canadian Wildlife Service, Québec Region. 79 pp.

Be that as it may, things have changed: it has become obvious that disastrous passivity will no longer be tolerated toward these resources. On the contrary, in a number of areas the search is on for effective means. And it is to be hoped that as public awareness grows of the resources which we still have — thanks to the St. Lawrence — so pressure will grow for renewed preventive and corrective action. The work done by pioneers in water purification and protection of species and wildlife habitats has not always been easy, but today it can be acknowledged that they did in fact defend a major cause from which there can be no turning back.

Already, because of spectacular successes, the obstacles to be overcome appear less awesome. Apathy has been shaken by threats and needs. We are now at the stage of that concerted effort demanded by public opinion. This has been a great step forward: gradually, the St. Lawrence in no longer being viewed as an obstacle to be overcome. The objective now is to tame it as a true natural resource, with consideration, for the benefit both of those who use it and of those who live along its shores.

2.3 A Cultural Heritage for the Exploring

The St. Lawrence was a major factor in the recent colonization of North America. If a French colony once existed in North America, we owe the fact to the St. Lawrence, along whose banks North America's only French power persists. Through the names of the places where it flows, and through its history, the St. Lawrence tells of a culture and of its origins; of past dreams and present realities. The St. Lawrence has been, and remains, a cultural basin from which we have derived much of our way of life. In this sense, it constitutes a prime cultural heritage. So much has been nourished by it — and through it — by the sea and seafaring trades: our villages, towns and cities; our occupations and industries; our economy and our relations with other countries or nations; our institutions, and of course our language and our imagination. The ministère des Affaires culturelles is particularly active in developing the heritage of the St. Lawrence valley, and rightly so: for many important events have taken place along this River, and on its islands and shores.

In the basin of the St. Lawrence can be found an immense store of tangible cultural property — so immense in fact, that one wonders whether it will ever be fully catalogued. A fair idea of the extent of this property, and of its principal components, can be had from the research done in recent years by the Direction générale du patrimoine in the ministère des Affaires culturelles.

In 1977, the decision was made to provide the Direction générale du patrimoine with the tools to carry out large-scale operations, and to set up the "macro-inventory" program. By using such methods as aerial photography to collect data, it was possible to obtain an overall view of the wealth of this heritage in much less time than before, to pick out concentrations and to identify themes on which subsequent research could be carried out. This inventory includes data related to

(1) history,

(2) ethnography,

(3) architecture in the countryside,

(4) architectural, religious and artistic heritage,

(5) urban architectural heritage,

(6) an aerial architectural inventory.

Photo: Gouvernement du Québec

The Pointe-des-Monts lighthouse on the North Shore was declared a historic monument in 1965.

Moreover, the Cultural Property Act of 1972 makes provision for two protective measures: recognition and classification. And the efforts in these two areas in the St. Lawrence zone have been many. More than 70 % of the department's action has been taken in relation to cultural property along the River. It was in this sector that almost all action to safeguard areas of historic or natural interest was taken.

Along the St. Lawrence can be found:

— sites bearing testimony to the first human activities in Québec (the archaeological site at Pointe-aux-Buissons, south of Montréal; the Mandeville site; the Lavoie site);

— locations of old fishing or trading posts (archaeological sites at Nantagamiou, on the lower north shore, and at Pabos, at the entry to Baie des Chaleurs) and vestiges of the first dwellings (Champlain's "Abitation");

— the sites of the first missions (the maison des Jésuites at Sillery, the Jesuit Chapel at Tadoussac);

— buildings or sites calling to mind the first types of land concession at the time of colonization (domaines, manors and seigniorial mills);

— buildings bearing testimony to the oldest techno-cultural traditions in construction (a great many houses along the River);

— the oldest buildings or domaines built by the first religious communities (hospitals, monasteries, schools, domaines, farms, etc);

— port zones and the oldest urban neighbourhoods (Québec City, Montréal, Trois-Rivières);

— the oldest buildings used for worship (churches, chapels, wayside chapels);

— structures or sites recalling major military activities (such as the Batterie Royale and fortifications at Québec City, and the vestiges of Fort Jacques-Cartier).

Also to be found are a number of items of recognized or classified cultural property directly related to maritime activity:

— the lighthouse at Pointe-des-Monts (north shore);

— the site of the Paspebiac fishing bank;

— the Godbout boat-building facilities (c. 1840), at Saint-Laurent, on the Île d'Orléans;

— the Marie-Clarisse II, a fishing schooner of 1922-1923;

— the Saint-André, a schooner used for coastal freghting and built at La Malbaie in 1956;

— the de la Grave fishing site at Havre-Aubert, Îles-de-la-Madeleine;

— the Fauvel House, last remaining vestige of the Pointe Saint-Pierre fishing establishment.

The Service de l'aide à la mise en valeur is also active. Consider the programs now under way on the Basse Côte-Nord, in the Mingan region, at Grandes-Bergeronnes, in the Saguenay region and in Gaspésie.

Strange though it may seem, the St. Lawrence, despite its beauty and its role in history, is little known. It has no place in our cultural memory. So many other waterways — the Nile, the Rhine, the Mississippi, the Seine, the Danube, the Amazon — have been idealized and endowed in song and story with intangible assets. There is a message here: the French culture in America, which owes so much to the St. Lawrence, would benefit enormously by associating itself more closely with its source — that same St. Lawrence River. A return to our roots, on the breast of the mighty St. Lawrence, would create a dynamic and realistic image of both our culture and our River.

During the last census taken in the United States, some 13.5 million Americans claimed to be of French origin, and half of those said their family came from Québec. This means that there are many more people in North America who belong to the culture born on the shores of the St. Lawrence than is commonly believed.

Amid the upheaval of urbanization and industrialization, we have also broken away from our maritime culture, or temporarily lost sight of it, although the return to a more natural balance has begun. We know for a fact that this heritage is not just a glorious piece of folklore, a remnant of tradition, or nostalgia for the wonder and adventure of the past. Nevertheless, there is no denying that the years of neglect have both tarnished our maritime heritage and dulled the spirit of initiative. There is much work yet to be done if full advantage is to be taken of the St. Lawrence River.

Efforts in more concrete areas, the results of which have been made public and are generally available, have been half-hearted. Research, inventories, plans and programs, promotional tools (museums, magazines, associations and so forth) are rapidly enumerated if we ignore the material lost in the bottom of a drawer or at the back of a filing cabinet; there is little choice but to make do with what is already to hand, or, if necessary, resort to improvisation. Some drastic diagnoses, such as found in the recent report by the Commission des biens culturels on Québec's maritime heritage, make no effort to conceal the damage caused by years of indifference, and laconically suggest new projects. The ministère des Affaires culturelles is definitely interested. During a first international symposium on maritime traditions in Québec, held in 1984, it was shown that there is a specialized labour force anxious to move ahead. But the teams are weak, large-scale projects are few and the available means are pathetic. Much of the work done by the ministère des Affaires culturelles is, for all practical purposes, known to very few people.

There is little talk of the relation between our maritime heritage and these activities. Nor are the research centres very active in maritime history or economy. Scientific publications in this area are rare. Although specialized and other articles are published rather regularly, they are generally descriptive. There are few comprehensive studies of the kind prepared by Jean-Claude Lasserre in his monumental work entitled *Le St-Laurent grande porte de l'Amérique*. Québec and the St. Lawrence River are deplorably absent from the big international magazines that regularly list maritime activities throughout the world, while some multinational corporations continue to foster the belief that the ports of the St. Lawrence are closed during the winter months. Even in schools and other educational institutions, little thought is given to the St. Lawrence.

The Québec museums that have maritime collections (the Musée de l'Île Sainte-Hélène, the Musée maritime Bernier at l'Islet, the Musée de la Pocatière, the Musée de la mer in Rimouski, the Musée régional de Gaspé, the Musée du Havre-Aubert, to mention the main ones) work in isolation and have neither the resources nor the trained staff for research. They must be praised for their dynamic interest and the heroic efforts they make to improve their exhibits, but the overall situation is far from satisfactory.

Our tale is not without its bright points. The Salon du Saint-Laurent, held in June 1982 during the international symposium on the St.

Lawrence-Great Lakes system, was an immense success. Over 25 000 people from the Québec City region, and over 100 000 from Montréal and elsewhere — once the Salon had moved to Man and his World — visited and enjoyed the exhibition. Other more recent exhibitions were also highly appreciated: Le Saint-Laurent et ses îles at the maison Chevalier in Old Québec, La collection Lecouvie-Déry in the Bibliothèque centrale de Québec and in the cultural centre in the Manoir at Notre-Dame-de-Grâce, traditional boats at Place Sainte-Foy, paintings by Robinson on île Sainte-Hélène, and others.

There are an impressive number of high-quality Québec films on the St. Lawrence. The Perraults, the Gosselins and many others have prepared exceptional documents. The move to give our maritime heritage its due is nevertheless slow and erratic. Parks Canada's archaeological projects have raised considerable interest, particularly among specialists and passionate amateurs. It would be too much to say that the movement is strong, steady, firmly rooted or very productive. Efforts to provide the opportunity for discussion, debate, action and leadership are hesitant, restricted, or obscure. New large-scale projects such as the Maison des sciences et des techniques in Montréal and the Musée de la civilisation in Québec City have not yet given any indication of a definite interest in maritime culture or any aspect of maritime life.

Having interviewed numerous representatives of the various interest groups and of the public service, the St. Lawrence Task Force considers it more to the point to stress certain aspects of the subject than to take an inventory of the ill-assorted projects on it. The way in which we maintain the interest of people at home and abroad in life on the St. Lawrence in the present and the past is a measure of our ability to take control of this unique and extraordinary treasure. We cannot expect renewed endeavours, indispensable public support or participation by individuals and institutions if there is no greater interest in studying and showing off the St. Lawrence, what is happening on it, what has happened on it and what it has given us. This is all the more important since Québec's maritime character had indeed been forgotten.

Given the present situation, it is difficult to base an interest in present-day maritime life on a living and meaningful heritage. However, it may be hoped that the growing interest Quebecers feel for the maritime world will be reflected in a greater concern for their maritime heritage. The essential point is doubtless to establish ties between the St. Lawrence as a natural and commercial resource and the St. Lawrence as a historical and cultural heartland. The St. Lawrence Task Force would therefore like to see an agency, created to exploit the River's wealth, pay special attention to cultural projects which, to a certain extent, are a guarantee of the community's participation in projects that greatly concern it.

2.4 Recreation and Tourism

The St. Lawrence and its tributaries have many characteristics that provide exceptional possibilities for recreation and tourism. The water, the shores, the towns, villages and riverside sites, the inhabitants, fauna and flora, the forests and visible geological formations, the roads and the architecture, the industries, the different ways of life, the history, the archaeological sites, the museums, the ports, the place names, the climate and seasons all contribute to making the St. Lawrence a boundless source of pleasure for vacationers. There is something for everyone: sailors, historians, cyclists, campers, passengers in any type of transport, nature-lovers, sports enthusiasts, and adepts in everything or nothing. Hotels, rooms, camp grounds, industrial cities, wildlife areas, marinas and fishing ports could alternate indefinitely along the river and its tributaries. There are countless occupations and itineraries to which both the inhabited and the uninhabited regions of the St. Lawrence lend themselves. If people felt the least attraction and just took the time, the St. Lawrence, once developed for tourism, would be accessible to a great number at a most reasonable price.

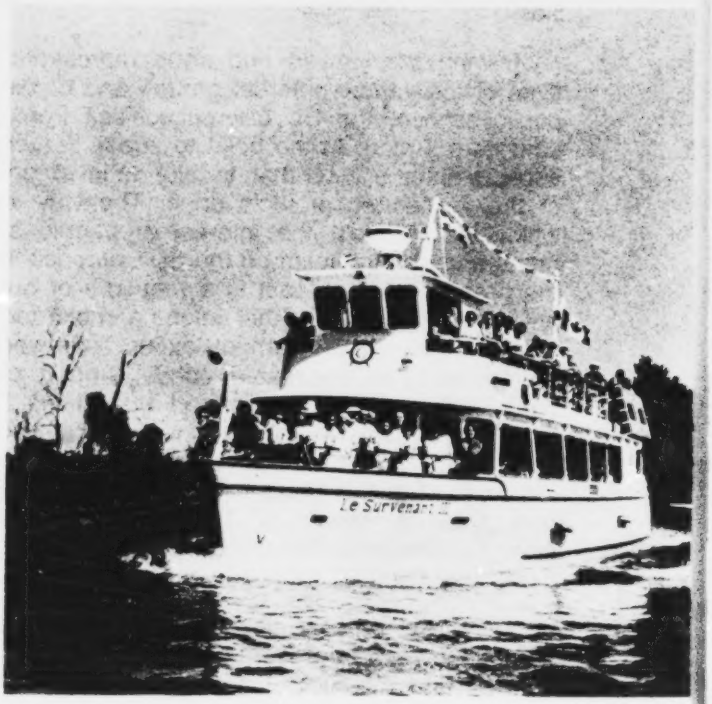
2.4.1 Activities

Thousands of amateurs go wind surfing and fishing on the St. Lawrence. The upper St. Lawrence teems with a great variety of fresh water species, avidly sought by sport fishermen from the Montréal region in particular. Were it not for pollution, that limits the consumption of fish captured, fishing spots would doubtless be developed and accessibility increased without a moment's hesitation. Sport fishing could even now be extended right down the length of the River and into the Gulf, where a wide range of

fish can be caught, from smelt to salmon, and including mackerel, eel, cod, tomcod, caplin, sturgeon and many more. Generally speaking, tourists seem to be increasingly interested in fishing for these species from the shores or wharves or from suitable boats. Quebecers, too, are more and more appreciative of these resources and want to make the most of them.

The Laurentian flora is also arousing ever-greater interest, and the different species of birds that inhabit the islands and shores have their admirers, although there are as yet only a few proper observation sites. Tens of thousands of hunters still go after certain migratory species during the hunting season, but bird-watchers and photographers can indulge in their pastimes throughout the year. In recent years, many Quebecers and tourists have found enjoyment in nature and have shown a tendency to draw closer to the River and its tributaries, depending on their means and the facilities. Here and there, exemplary sites may be found that attract a great many people and allow for a wide variety of recreational activities: there are parking lots, paths and boardwalks, boat ramps, blinds, guides, maps, sanitary facilities, sports equipment rentals, and so on — simple improvements that help make the River and its wealth accessible.

Judging by what is happening in the United States, in Ontario and, closer to home, at cap Tourmente, coastal areas designated as wildlife preserves or nature parks exert a powerful attraction on a certain type of tourist. Recent studies show that 25 to 30 percent of the vacationers from the neighbouring provinces, New England, the Midwest, and the Atlantic coast down to the Carolinas, which account for most of Québec's tourists, seek outdoor activities when they go on holiday. Parks and wildlife preserves along the St. Lawrence River would surely attract some of these people to Québec. About 25 percent of this same population want to visit historical sites and monuments. The St. Lawrence corridor actually has the greatest concentration of elements from our historical and cultural heritage: archaeological sites, traditional houses, churches, mills, and so forth. Highways 132 and 138 constitute historic routes beginning at the Ontario border.



Photos : Gouvernement du Québec

If the St. Lawrence were better developed, this would result in more recreational and tourist activities at prices within everyone's range.

All these natural and historic sites can be reached by water, either in a private boat or in a variety of chartered vessels, an added attraction for boating and excursion enthusiasts. The growing popularity of the excursions offered by the Société linéenne in the spring to watch the birds on the islands of Montmagny and in the summer to watch the whales in the St. Lawrence estuary is ample proof of the interest excited by such activities. Additional opportunities to observe nature and visit historic sites in the Montréal region, on the islands of Sorel, on the Saguenay and in Minganie would attract a great number of tourists.

The shores of the St. Lawrence and of many of its islands have sandy beaches and places suitable for swimming which cannot be enjoyed at present because of bacteriological pollution. Once the water is cleaned up, these spots will come back into their own and thousands of Quebecers will again be able to swim safely in the St. Lawrence. Skin-diving is another sport that would doubtless grow in popularity if the quality of the water permitted. According to François Hamel, director general of the Fédération québécoise des activités subaquatiques, Québec possesses a good source of tourist revenue in the beauty and specificity of its marine flora and fauna which live in cold salt water. There is a potential here waiting only to be developed and publicized.

Cleaner water could only add to Quebecers' taste for boating and attract enthusiasts from outside the province. The St. Lawrence and its navigable tributaries constitute a major section of the North American network of waterways. But there is one important link missing: a canal through the Montréal archipelago joining the St. Lawrence to the rest of the network. Boats exceeding 6 metres in length can use the Seaway but they will quickly become an encumbrance with the increase in commercial traffic. Smaller boats must stay either above or below Montréal. Boating would also benefit from a system of service points along the shore, particularly ports of registry, launching ramps and emergency shelters. Ports of registry and ramps should be located in relation to the pleasure craft population and the major tourist centres, while emergency shelters should be built in those areas most exposed to bad weather.

Most of the Québec network can be divided roughly into two sectors presenting very different problems: upriver and downriver from Québec City. The River above Québec City is easy to navigate: the channel is narrow, the buoys numerous and the bathymetric data plentiful. There are over 61 marinas in this section, all safe ports where boaters passing through can seek shelter at the first sign of a squall.[1] Below Québec City, however, navigation is much more difficult with the tides, the fetch of the waves and the capricious weather of the estuary and the Gulf to consider. It is a challenge for seasoned sailors, who must be able to count on a network of shelters and port facilities along both shores. In addition to satisfying the need for security, these facilities would enable sailors to go ashore and visit the surrounding area, an essential factor if boating as a tourist activity is to be profitable for people living along the shore.

Not only short excursions but commercial cruises should be introduced throughout the St. Lawrence-Great Lakes system.[2] At present, there are some foreign lines sailing the St. Lawrence and stopping in Québec City and Montréal, but these are the only two cities in Québec that enjoy economic spin-offs from this activity. Most ships are so big they cannot draw alongside the small docks below Québec City. These cruises are not based on the St. Lawrence and the Saguenay as the cruises of the Clarke and Canada Steamship lines once were.

Guy Parent, director of tourism for the Société d'expansion économique du Saguenay, believes that the difficulty encountered in persuading captains to dock in Chicoutimi, and consequently to put out a certain amount of money, derives essentially from the surtax imposed on foreign vessels, which prompts their owners to remain at sea. The result of this anti-economic measure is simple: tourists come to the Saguenay for the best it has to offer — its grandiose scenery — but the region does not enjoy any economic benefits because the passengers, generally rather well-to-do, do not leave the ship. The Corporation de promotion économique de la Baie-des-Ha! Ha! carries this

1 GILLET, C., MARIER, P., CHARRON, B., LAFEUILLE, G., CASSAING, M., GRENIER, J., MATTEWS, L. and LUCAS-GIRARDVILLE, J.M., (1980), *Les croisières au Québec*, Québec City, ministère de l'Industrie, du Commerce et du Tourisme, Service du programme de développement touristique, 243 pp.

2 BORDELEAU, Jean, (1983), *Le Nautisme*, document prepared by the MLCP for the St. Lawrence Task Force.

point yet further, stating in a brief that the same difficulties apply to the introduction of private cruises which is limited not only by exorbitant costs but by the red tape required to obtain the necessary papers. The difficulties encountered by local entrepreneurs who wished simply to set up a mini-cruise operation constitute another stricking example cited by the Corporation. In fact, government requirements are both too numerous and too rigid.

It is time the possibility of re-introducing cruises on the St. Lawrence and the Saguenay was examined. Small ships (about 5 000 tonnes), able to accommodate 200 to 300 passengers, could draw alongside a number of wharves on the River. Activities on these cruises would be based on the historical and cultural heritage and the natural attractions of the St. Lawrence, its islands and its shores. These ships could go directly to the Great Lakes for their clientele, at the same time introducing foreign tourists to that region.

In addition to passengers with berths, these ships could cater to pedestrians and cyclists who want to sail from one port to another. Routes linking Gaspésie, the Îles-de-la-Madeleine, Anticosti, the Côte-Nord, Labrador and the Saguenay could perhaps be developed.[2] Market studies indicate that people are interested in excursions like a cruise on the St. Lawrence. Why not take advantage of our proximity to the Great Lakes (Niagara Falls, the Thousand Islands, etc.) and offer summer cruises of one week from Thorold or Port Weller to Chicoutimi, for instance?

In addition to elaborately planned commercial cruises, one-day excursions based on specific centres of interest could be organized, with specially designed boats capable of carrying 50 to 100 passengers safely and comfortably, and equipped to provide shelter from bad weather.

On the lakes west of Montréal, in the islands of Sorel or Montmagny, around the Île d'Orléans, at the mouth of the Saguenay, in the Mingan islands or on the Basse-Côte-Nord, excursions with a specific theme could be organized in the summer and early fall. This type of service already exists here and there along the St. Lawrence, but it is little known and the vessels used are not always adequate.

Photo: Gouvernement du Québec

Specialized activities would make these excursions a much more enriching experience. The fact that tourists and vacationers are often in search of information or guides to enlighten them on the natural and cultural wealth of the St. Lawrence is worth emphasizing.

In short, the situation may be summed up as follows. The entire St. Lawrence corridor, including the Saguenay, the Richelieu and the Ottawa rivers, has an extraordinary potential for outdoor activities of all sorts during most of the year. To exploit this potential, the most likely sites must be protected, developed, and rendered easily accessible without jeopardizing conservation, which means that physical structures must be kept to a minimum. Launching ramps, marinas with services and emergency shelters will be required to promote boating. Customer services, such as transportation and lodging, should be left to the private sector, but government aid will probably be requested since initial investments will be great and, in some cases, the services will only yield a profit in the relatively long term.

2.4.2 The Agents

Like the other maritime sectors, recreation and tourism involve the Government of Canada, the Québec government, regional county municipalities, municipalities, private organizations and private individuals. Parks Canada, the Canadian Wildlife Service and Tourism Canada have as part of their mandates to see to the conservation and development of remarkable sites designated as parks or wildlife preserves.

In Québec, outdoor recreation and wildlife preservation is the responsibility of the ministère du Loisir, de la Chasse et de la Pêche. Among other things, this department must

1 LECLERC, Réjean, (1982), *Devis d'étude en vue d'établir un ou des services de croisières sur le fleuve Saint-Laurent*, Québec City, St. Lawrence Task Force, 4 pp.

gradually establish a network of parks for recreational or conservation purposes, as well as a network of wildlife preserves. It is also responsible for introducing a public services policy for these recreational activities. The department may either act directly or delegate responsibility to individuals, organizations or local governments (dealers, outfitters wildlife management areas, regional county municipalities and the like). Direct intervention by other departments is not precluded, however. The ministère de l'Environnement stepped in at Île Sainte-Hélène; the ministère de l'Énergie et des Ressources administers several nature centres, in particular Duchesnay near Québec City and the Palissades in Charlevoix. The ministère des Affaires culturelles is responsible for protecting and enhancing the cultural heritage. Most of its surveys and investments have been in the St. Lawrence corridor. Other departments such as the ministère de l'Industrie et du Commerce and the ministère du Tourisme produce documents providing information and publicity, or are in charge of infrastructures. The municipalities and regional county municipalities administer services and equipment that have often been set up by other levels of government. Many private organizations or individuals offer recreational or tourist services. The wildlife management areas (ZEC), marinas and excursion and cruise companies are examples.

Such a large number of agents is not in itself a problem. In fact, it is proof of widespread interest. However, rational administration is not always well served by empirical experience or overlapping areas of activity. It has been noted that interesting projects have run up rather frequently against uncertainty over the areas of responsibility of the various agents or against administrative difficulties. The St. Lawrence Task Force has come to heartily wish for a review of the general situation of the agents involved in recreation and tourism or at least for measures to facilitate cooperation among those responsible. Not only are projects in the sector at stake, but also the possibility of greater dialogue in this area and in others related to the development of the St. Lawrence.

We do not want to repeat here what has already been said about the cultural history of the St. Lawrence, but it is clear that a great many tourists would be attracted by the evidence of this history found along the St. Lawrence corridor, not to mention the roads and trails, appropriately marked, the fine food and the many different institutions around which a wide variety of trips and activities are organized for vacationers and tourists. There is no doubt that these are all major advantages to be reaped both by Quebecers and by people from outside the province who visit the St. Lawrence, learn about it and form opinions on it. Lucien Harvey, mayor of La Malbaie, believes that minimal action could be taken in the form of scenic rest areas and road signs guiding visitors to natural curiosities and cultural attractions.

Mr. Harvey thus touches on one of the more revealing signs of the difficulties encountered in developing a complex whole when not in the habit of considering that whole. This is perhaps one of the chief problems in developing the St. Lawrence: keeping sight of the value and importance of complementary tasks entrusted to different networks.

Many inventories and numerous studies have been made of the St. Lawrence, but seldom has an effort been made to combine the results and take advantage of the bits and pieces of information. Similarly, initiative has been shown as regards commerce, the cultural heritage, wildlife or tourism, but rarely have those responsible managed to coordinate their efforts. The professionals and specialists are more deeply divided than the areas in which they work. Yet, development implies progress in one area or another as much as it does complementary and cooperative action in the choice of solutions; it implies profit for each area as much as it does satisfaction for the greatest number, whatever the field of interest. Concerted effort cannot be bypassed without running, sooner or later, into a costly catching-up operation. There is no way to do every thing at once. By dint of concentrating on one sole aspect, or on different aspects taken in isolation, it necessarily becomes extremely difficult to solve the overall problem.

As the St. Lawrence Task Force extended the scope of its investigations beyond maritime trade, not only did it discover more and more examples of fields of activity where concerted action was weak, it also realized that the advantages of bridge-building between the sectors concerned were growing. Commerce could not continue to develop if it systematically ignored the problem of water quality. Recreation and tourism could only benefit from enhancing the cultural heritage and from associating with those responsible for the roads and railroads, and vice-versa.

The many different areas of government jurisdiction, often coordinated haphazardly by trial and error, present a major difficulty. But it is a safe bet that increased coordination in Québec would result in successful, highly efficient undertakings fostered by a renewed interest in the natural, cultural and commercial wealth of the St. Lawrence. This point will be broached once again in the third part of this report. Let us now look, without further ado, at the hydroelectric sector.

2.5 Hydroelectricity

Memories grow dim with time, but the development of the St. Lawrence owes a lot to the harnessing of electric power. While everyone hesitated over undertaking the modernization of the canals and locks, while obstacles of all sorts threatened the existence of maritime transport projects, the promoters of hydroelectric power derived from the St. Lawrence judged the River's potential to be truly exceptional. They took the bull by the horns and proved that there were numerous advantages to taming much of the waters of the St. Lawrence, in winter as in summer.

It is true that, in other respects, the St. Lawrence loomed as an obstacle to the transmission of electricity, but the obstacle was overcome. The achievements show to perfection that confidence, self-esteem... and profit derive from taking up a challenge. The successes of Hydro-Québec are a source of pride for Quebecers. They demonstrate the audacity with which the St. Lawrence must be developed, but they also suggest that Hydro-Québec should be elected one of the main partners in its development.

The St. Lawrence drops barely 20 metres in altitude from one end of Québec to the other, and most of that drop is found above Montréal. It is here, mainly at the site of the rapids, that the increased flow of the River favoured (Beauharnois, Les Cèdres) or could favour (Archipel) the construction of power plants. The capacity of Beauharnois is 1 593 160 kW and could be increased by 50 000 kW, while the capacity of Les Cèdres is 162 000 kW and could be increased by 15 000 to 25 000 kW. As for the Archipel project, it represents a potential of 600 000 kW. The advantage of these plants is that they are located in the heart of a consumer centre and relatively few transmission lines are required to reach their customers. The St. Lawrence corridor is the main inhabited and industrialized area in Québec and, as a result, the main source of demand for electric power.

This concentration of the load along with the infrastructures for sea, river, rail and road transportation affect the choice of sites for power plants that do not require a certain flow of water or drop in its level. The St. Lawrence provides easy access to fuel supplies (heavy fuel oils at Tracy and probably methane or coal at other sites) and transportation for heavy equipment for thermal and nuclear plants, for instance. The St. Lawrence also provides cooling water at Tracy and Gentilly.

The greatest hydroelectric potential, whether developed or not, is found in the large secondary basins on the north shore of the St. Lawrence, while the demand is on the south shore and increasingly in the United States. One way or another then, this energy must cross the River. There are major problems inherent in installing transmission lines across the St. Lawrence. In some cases, the overriding difficulty is the distance between the two shores; in others, it is the density of the riverside population or the aesthetic values or cultural heritage of the communities involved. Shipping and ice are two other factors that must be taken into consideration.

Unfettered navigation on the St. Lawrence requires a minimum clearance of 50 metres. Underwater cables must be protected from shore ice and from the ships plying the River. So far, shore-to-shore link-ups have been aerial and have cost between $20 million and $30 million each. Underwater cables were used to cross from the Beaupré coast to Île d'Orléans, from the Charlevoix coast to Île-aux-Coudres, and from the south shore to Isle-Verte and Île-aux-Grues. Nowhere do the cables cross the main commercial shipping channel, except between Île-aux-Coudres and Charlevoix. At present, there are about 20 crossings.

Under the present equipment program and with the priority given projects promoting the sale of surplus energy, progress is being made on plans for:

— doubling line 7042 linking Châteauguay to Chénier;

— doubling line 7002 between junctions "J" and "K" at Tracy or Carignan;

Photo: Hydro-Québec

The River's water volume has been conducive to the installation of many power plants. Today, Beauharnois produces some 1 600 000 KW, and this can be increased to 50 000.

— making a new crossing somewhere between Québec City and Trois-Rivières, at a site to be determined;

— an underwater crossing somewhere between Rivière-du-Loup and Rimouski, linking the Côte-Nord and the Bas-du-Fleuve. Such a cable, however, would pose serious technical problems;

— a crossing between the Gaspésie and the Îles-de-la-Madeleine.

Hydro-Québec is one of the largest property owners in Québec, second only to the government. Its biggest properties on the St. Lawrence are above the Les Cèdres and Beauharnois plants (over 2 000 hectares just for the canal's sedimentation basins and sub-basins) and at the Tracy (140 hectares) and Gentilly (200 hectares) plants. Hydro-Québec seldom owns the riverside land under the power lines crossing the St. Lawrence. Rather, it holds servitudes or emphyteutic leases. It also rents large areas of the River in front of its plants in Tracy (about 25 hectares) and Gentilly (about 200 hectares). Hydro-Québec's land is primarily intended for the exclusive use of the owner but a wide variety of secondary uses, compatible with the corporation's activities, are tolerated under its lines — farming, recreational activities, and so on — as well as on the land above its power plants — holiday resorts, parks, wildlife developments such as Ducks Unlimited in the sub-basins of the Beauharnois canal.

As pointed out above, the greatest hydroelectric potential is found in the tributaries on the north shore of the St. Lawrence. Several large developments that have a significant effect on the St. Lawrence and its resources have already been completed. The hydroelectric dams play an important role in regulating the rivers and the flow of water into the St. Lawrence. The dams, and changes in the course of the rivers, make the waterways less accessible to fish and can destroy spawning grounds. Special arrangements such as fishways must then be made to help the fish upriver. Grids must also be installed to keep fish on their way back down the River from being dragged into the turbines.

In the interest of a higher economic yield, it has often been suggested that the water of certain basins and rivers be diverted into a single waterway along which several plants could be built. Regardless of the advantages in terms of hydroelectric power, the impact of artificially altered basins on the ecology could be quite serious, particularly if the salmon rivers of the Côte-Nord were diverted. The estuaries of both the diverted rivers and the recipient rivers are also affected by the change in the volume of water and in the nutrients in suspension. Their role as a preferred habitat for fish and marine mammals could change drastically. An internationally known case is that of the Nile estuary which lost practically all its fishing potential when the Aswan dam was built. In Québec, commercial fishing in the Gulf and the estuary is a major industry and hydroelectric developments must not lead to the decline or disappearance of certain species, particularly salmon. The survival of the salmon depends above all on the preservation of the rivers in which it spawns, and the rivers of the Côte-Nord, the Gaspésie, Île d'Anticosti, and the estuary as far as Donnacona all belong to this category. It is suspected that the dramatic drop in the number of belugas in the St. Lawrence is related not only to pollution but also to the impoverishment of certain estuaries, in the Manic-Outardes area, for instance.

Hydro-Québec, in collaboration with government and university researchers, must therefore acquire in-depth knowledge of the ecology of the shore and the estuaries and of the interaction between the rivers and the sea before embarking on any more major development projects in this region. The subsequent analysis of the impact of a given project will only be simplified.

Archipel, an immense project in the Montréal region, has several original aspects. In 1976, the Committee on Flow Regulation concluded that, due to the prohibitive cost of the work required on the Lachine rapids, flooding in the Montréal region could not be eliminated. In 1979, Archipel was born of the idea that a greater evacuation capacity of the Lachine rapids could be obtained and used through hydroelectric installations. With that, Archipel became an integrated development project with three facets: hydroelectric power, flow regulation, and shore and waterway development.

On April 19, 1984, a report was tabled before the Cabinet with a view to continuing the feasibility study of the project in 1984-1985 and 1985-1986. More recently, at the opening of the latest Legislature, on October 16, 1984, Québec's Prime Minister indicated that the government wanted to go ahead. He stressed the

importance of developing the shores and waterways in the interests of water quality, and so that new expanses of water would be accessible to the people of Québec and to visitors. As yet, no one knows to what extent the water will be regulated or whether a hydroelectric plant will be built. Public hearings must be held first, and government decisions made following a detailed presentation of the project.

In any case, a park project of this type is of the greatest importance for the Montréal region and for a very sensitive section of the River, both because of its objectives and because of the places and the people it would affect. The integrated approach to the project, based on a thorough understanding of its impact, should be cited as an example. It is an illustration of the cooperation sought by the St. Lawrence Task Force in every endeavour to develop the St. Lawrence.

2.6 Commercial Fishing

Québec has always been involved in the fishing industry, for one very simple reason: the Gulf of St. Lawrence is an extremely fertile fishing ground, rich in tradition and endowed with numerous species in great quantities. The first fishing excursions to the Atlantic coast and the Gulf were organized around the Grand Banks and coastlines because of the boundless quantities of fish.

Today, the influence of climate, climatic variations and geographic characteristics on the exceptional reproduction and feeding conditions found there by different species is better understood. A powerful and highly original plankton and oxygen renewal cycle in the Gulf, along with the periodic resurgence from the deep of nutrient-rich water, creates and ideal environment for the resident and migratory species. The relief of the sea bed in the immense protected indentation that forms the Gulf includes several huge troughs and provides temperature zones suitable to the growth of plankton. Even the winter season plays a role in maintaining the fish resources. Common squid, Boston blue fish, herring, salmon, sturgeon, tuna, cod, flounder, haddock, smelt, lobster, shrimp, crab, mackerel, sea perch, common dab, tomcod — there are dozens of commercial species of fish, crustaceans and shellfish.

In 1980, 72 million tonnes of seafood products were unloaded in the fishing ports of the world. About 60 % came from the temperate water of the North Pacific and North Atlantic where large, highly productive continential shelves are found.[1] As has already been stated, the Gulf of St. Lawrence is in one such zone. In 1977, Canada decided to extend its territorial jurisdiction to 322 km (200 mi.) from its shores, in order to better manage its resources and to reserve fishing rights for Canadians.

Canada recently obtained a verdict of the International Court in favour of its jurisdiction over part of Georges Bank where scallops, which, along with herring, are one of the most profitable species, are extremely plentiful. Canadian landings on the east coast, which slipped to less than one million tonnes in 1972, have picked up since 1977, maintaining a constant level of about 1.2 million tonnes. Most of the landings belong to Nova Scotia and Newfoundland, which also share, almost equaly, 80 % of the catches. New Brunswick follows, with 12 % to 15 % of the catches. Québec gets 6 % to 8 % and Prince Edward Island, 2 %.

Québec landings reached a peak of 117 000 tonnes in 1970, representing 10.7 % of the catches in Eastern Canada. A gradual decline ended in 1976 when catches equalled 38 000 tonnes, barely 4.8 % of the catches in the region. Since 1977, this tendency has been reversed and, in 1982, landings totalled 79 000 tonnes, 7.3 % of the eastern total.

Prices, however, have evolved considerably. While the record volumes of 1970 had a landing value of $11 million, those of 1982 had a value of $50 million. Although the figures quoted are in current dollars, the value of the catches has obviously increased. These facts clearly illustrate the economic importance of commercial fishing in Québec. Turnover already exceeds $100 million a year, and is growing with advances in processing technology.

The number of fishermen fluctuates sharply from one year to the next. It reached a peak of 6 460 in 1975, fell to about 4 700 in 1982 and rose again to over 5 000. Two-thirds of these jobs, however, last only five months a year. Plant workers, some 4 000 strong, have suffered the same fluctuations in numbers and working days. Moreover, the Côte-Nord continues to produce a disproportionate number of Québec's fishermen, 28 %, while accounting for only 8 % of its plant workers.

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1 Council on Environmental Quality and U.S. Department of State, (1980), *The Global 2000 Report to the President*, 766 pp.

Photo: Gouvernement du Québec

Already, the turnover for Québec's commercial fisheries is far beyond $100 million a year — a figure which increases in proportion to progress in processing.

Turning to fishing equipement, there were 2 452 boats in Québec in 1981. Only 27 boats measured over 20 metres in length, and 6 over 27 metres. Small boats are particularly numerous on the Côte-Nord. Nonetheless, there were 1 000 over 17 metres long. A large proportion of the Gaspésie fishermen and most of those from the Côte-Nord were engaged in coastal fishing. For these fishermen the largest economically viable boat measures 12 to 14 metres. The fishermen in the Gulf, however, are best served by an average trawler measuring 18 metres or more. For fishing outside the Gulf, boats over 30 metres in length are preferable.

The relatively small proportion of landings in Québec and the short fishing season are reflections of the fact that fishermen have traditionally remained within the estuary and the Gulf. The drifting ice in the Gulf in winter shortens the fishing season significantly. In addition, the fish and shellfish population of the Gulf have natural biological limits that cannot be exceeded.

To manage fishing grounds efficiently, the habitat and its potential, the ecology, and the dynamics of the populations of the species fished must be properly understood. Annual quotas, fishing seasons and the technology most likely to protect the habitat and stock regeneration can then be determined and, possibly, fishing and processing techniques improved. Research and expertise therefore have an important role to play. The field is complex, especially since some species are extremely mobile, migrating between the Gulf and the ocean. The decline of certain species, such as herring and sea perch, causes concern.

On the other hand, ecological research in the sixties brought to light large communities of shrimp, crab, and scallops in the Gulf and the estuary, making it possible to vary the landings with luxury species.

The ministère du Loisir, de la Chasse et de la Pêche has been striving to preserve the major salmon rivers for some years now. It protects and develops spawning grounds, raises young salmon and builds fishways. Unfortunately, Québec is not always the beneficiary of these efforts. In the early seventies, European fishermen chanced to discover the feeding grounds of the salmon off the coast of Greenland and for several years they trawled intensively until an international agreement was concluded to cut back on this disastrous practice.

In 1972, Ottawa prohibited commercial salmon fishing in the St. Lawrence estuary and along the shores of Québec and New Bruns-

wick. Fishermen were given financial compensation. In 1976, however, illegal catches were estimated at 5 000 tonnes a year. In Québec, sport fishing has been strictly regulated.

Federal regulations do not apply to Newfoundland where catches totalled 2 000 tonnes in 1981. The Native peoples, too, continue to fish for food. Given the situation, the annual 1 000-tonne quota on catches off Greenland is often described as too high. Poachers of course, do not respect it.

In short, there is lively concern over the replenishing of stocks. One solution is to breed fish. At Tadoussac and near Fredericton, to mention only two sites, smolts are raised and, in their third spring, the young salmon are released to descend to the sea. North of Halifax and elsewhere, aquaculture is practised to breed fish for immediate commercial consumption.

The Québec and Canadian fish industry has long depended on the salt and smoked fish markets in the Mediterranean and Central American countries and in the West Indies. It came close to failure by neglecting to modernize its fleets, its techniques and its processing plants. For some time now, Québec has been implementing an ambitious recovery and modernization program. In the spring of 1982, it passed regulations on the quality of sea products; these are already in force. While it is still too soon to judge the results, it is not too soon to encourage Québec to accelerate the development of its fleets and of its infrastructures for the secondary and tertiary stages of fish processing. Among other things, Québec should encourage deep-sea fishing and much more fishing in the economic 200-mile coastal zone.

Between 1976 and 1982, under a program providing financial aid for building fishing boats, the ministère de l'Agriculture, des Pêcheries et de l'Alimentation helped finance 167 fishing units, 135 of which were new vessels, 14 to 26 metres long. On the Basse Côte-Nord, the fleet has grown by 68 boats 14 to 20 metres long. Since a 24-metre shrimper properly equipped with electronic instruments can easily cost $1 million, and its daily operating costs can amount to $2 000, including $400 to $500 for fuel, all the parties concerned obviously made a considerable financial contribution which has been maintained in recent years.

It must not be forgotten that the rational development of all the commercially valuable species requires in-depth knowledge of the marine environment and the ecology of the fish populations, a knowledge that can only be acquired through a continuing program of research in oceanography and marine ecology. As yet, this area of research has been the particular domain of the federal institutions located in the Maritimes. If Québec is to carve a place for itself in this area, it must develop its own expertise. To this end, it must consolidate and develop the research teams of the ministère de l'Agriculture, de la Pêche et de l'Alimentation and of the Rimouski university complex. It would also be advantageous for Québec to have a research vessel, in addition to the one the federal government recently made available to scientists.

On this subject, Jean-Rock Brindle, director of the Department of Oceanography of the University of Québec at Rimouski, wrote that research on the River must not be neglected, especially, perhaps, research on the region from the Saguenay to the Gulf of St. Lawrence. He stated that, to this end, there is an urgent need for Québec to support its researchers by giving them the opportunity to sail that vast expanse of water in a suitable research vessel entirely at the disposal of Québec scientists.

It is not enough to learn more about the resource and to demand a fair share of the catches. In addition, the best possible technology must be sought both for fishing and for preparing products for the market, in order to ensure a uniform level of quality. A rapid delivery system for fresh fish must also be developped.[1] Technology aside, it is essential that catches be unloaded rapidly. Since fishing vessels are not very fast, and since they work a vast area, a wide network of unloading ports must be developed along the shores. Not only must this network be maintained in good condition, it must also be expanded.

Germa, a marine resource study group attached to the University of Québec at Rimouski, believes that the main obstacles to making commercial fishing in Québec profitable are in marketing. In a recent paper, the group stated that in Canada, with the exception of a few large companies, marketing is static and piecemeal since it is the responsibility of a very large number of small producers.

1 Québécair has introduced a Québec-Montréal-Boston route.

In the same paper, while praising the progress made in biological research, the group pointed out that private and public research in the economics and management of fish resources is inadequate or, in certain areas, totally nonexistent.

It may be that living conditions or the economy in North America have not been as favourable as they might have to the development of commercial fishing, which would explain in part the industry's stagnation in the past and even the relative poverty of fishing villages, so long isolated from the major centres. Indeed, it is astonishing that our exceptionally rich fish resources have not roused more entrepreneurial spirit or stronger initiative in the processing sector, which adds so much to the value of the catches. We have not tried to explain the phenomenon, content to note that a fresh wind has turned the situation around and initiated a recovery. Once again, we feel the need for a comprehensive development strategy for the St. Lawrence, which would provide effective support for the successful undertakings of recent years.

Québec's ties to the St. Lawrence would be special in that they would not consist simply in management by a variety of specialized firms, but would be the result of closer relations of all sorts between regions and interest groups. The cultural and economic benefits would be increased since greater initiative would be shown and commitments would be more rational.

2.7 Conclusion

This review of the main resources of the St. Lawrence has shown that the responsiblity for development devolves on many heads. Prodigious though these resources may be, they remain fragile in many respects.

Natural resources, which need simply be exploited rationally, are only the beginning. Our resources are varied and the competence that will be required to use them must also be varied. Moreover, efforts must be coordinated so that their results are cumulative rather than dissipative. This is no small task insofar as the rational management of the varied resources of the St. Lawrence might require that certain conflicts be resolved or arbitrated. Tourist and recreational development on the shores, for instance, could clash with the need to devote some land to industrial port sites. Reconciling viable industrialization with major investments in wastewater treatment also poses a potential problem.

In any case, the agents are so numerous that past experience has not yet given rise to a global view of the situation or to general development strategies for the resources of the St. Lawrence. As far as Québec is concerned, a determined effort must be made. To fail to act would be to admit more or less passively that Québec's responsibilities can be determined and dealt with only through major problems or crises.

It is obvious that maritime commerce and the maritime economy are pivotal to the relations between Quebecers and the St. Lawrence. But the relations are not direct; they are filtered through governments, departments, agencies, organizations, industries. They are watered down by the general public's ignorance of the specialized tasks of maritime commerce, its successes and its difficulties. Navigation itself is not an integral part of daily life in Québec. All the more reason for the Québec public to be ignorant of the problems involved in developing the waterways and port infrastructures. All in all, there are few maritime institutions that serve as a touchstone for the information given out by the media.

If only because of the difficulties encountered by the people who use the St. Lawrence, maritime trade in Québec does not hold a very significant place in economic plans, political stakes or the media. Already this in on longer true of the environment or the ecology, since these subjects have acquired a great deal of importance in recent years. Diagnoses, opinions and plans have been put forward specifically for the St. Lawrence. Structured projects have even been drawn up and publicized. But decisions are not being made, although the present situation seems to call for immediate action and priority status.

Government organization per se is involved in a thousand and one different ways. Yet concerted action is so far from evident that there is justification for thinking that the Québec government has no integrated approach to questions concerning the St. Lawrence. The Prime Minister's statement in the Inaugural Address in the fall of 1984 was original and beneficial. It evoked a real concern over the development of the various aspects of the St.

Lawrence. It denoted an awareness of the difficulty for Québec of improving the management of the resources of the St. Lawrence. It gave evidence of renewed interest.

Québec's experience of the St. Lawrence is centuries old. Quebecers are the River's tenants, so to speak. Whether they realize it or not, they once depended on its resources and, to a large extent, they still do. The crumbling away of a maritime conscience is neither an old nor a universal phenomenon in Québec. At a time when renewed interest and greater responsibility are being sought, government projects will definitely be well received.

Our task is not to propose outright a vast plan of action carefully divided into specific programs in each of the many domains we have looked at. Rather it is to suggest means of activating the development of the St. Lawrence and concrete government involvement. Our primary responsibility was to examine international maritime trade, without, for that reason, ignoring other aspects.

The work we have done and the people we have consulted have confirmed the importance of refraining from undue compartmentalization of the various domains if we wish to find a broad base among the parties concerned and a general and lively awareness of the task at hand. Therefore, taking into consideration all the points raised in this report, we will now try to suggest ways to revive the St. Lawrence. Our orientation will not change: the St. Lawrence is a national resource which must be given greater attention; Québec is nothing less than the most important maritime province in Canada; the gouvernement du Québec has every reason to play a greater role in the destiny of the St. Lawrence, so that it becomes increasingly the master of the River's resources and the beneficiary of its largesse.

The third part of this report will deal with the elements of a development strategy for the St. Lawrence.

PART THREE

The St. Lawrence: An Asset to Be Developed

To be rediscovered and developed.

Photo: Jacques Lessard

Elements of a Strategy

This was our starting point: the privilege of living in a vast maritime region and being heir to the centuries-old heritage of the St. Lawrence. But even as we recalled this we had to remind ourselves that Québec has tended to forget its maritime wealth, and also the difficulties and stakes it has in the trade on the St. Lawrence route.

Settled as they have been for more than three centuries in the St. Lawrence valley, Quebecers take the River for granted, as something that does not require any special attention. It is natural that it should be there. And as often happens in such cases, little is done to develop its potential. It goes on from day to day, without bothering anyone.

First of all, the St. Lawrence belongs to Québec, even if there are several governments that have jurisdiction over it. Québec must unhesitantly assert its jurisdiction and assume the responsibilities involved in its development. There must be short, medium and long-term objectives, and public discussion so as to achieve a general consensus on this national resource. And in any event, there is no lack of interest on the part of a whole throng of parties involved. Public discussions on the Projet Saint-Laurent revealed that many people are looking forward to an eventual Québec policy on integrated development of the St. Lawrence.

The primary concern of Projet Saint-Laurent was to be the economic importance of maritime trade and commerce. Yet the terms of reference as defined, and subsequent government action, showed that it was determined not to isolate commercial transport from other considerations, and that it intended to adopt a comprehensive approach to development of St. Lawrence resources. This flexible approach made it easier to prepare this report. It was realistic not to try to do everything in a hurry; it was no less realistic to encourage open consultation among all groups concerned. Opinions were heard from a wide variety of individuals and institutions. On the whole, it was clear that problems and shortcomings were not limited to a few specific sectors.

But it would be going too far to say there was general and spontaneous agreement on general strategies, and on suggested courses of action the government should take, or that would fit into a general strategy. Each group or individual, on the contrary, was concerned with problems in one sector or another, and with

suggestions for correcting one shortcoming or another. This is perhaps why the Task Force often ran up against distinct and often contradictory aims. One group wanted all windsurfers banned from the River and everything done to promote traffic for the largest ships possible. Another felt quite the opposite, that the major public priority should be the revival of tourism and use of pleasure craft, since they are of direct benefit to the users. And there were those who had nothing in mind but the growing pollution of the River and the threat to marine animal life, or the federal encroachments, or the obsolescence of the cargo fleet, or the difficulties of commercial fishing.

There was one constant theme in the consultations: a feeling that the government, or governments, should initiate the recovery process and help develop maritime resources and activities, since the scope of the many problems and questions by far exceeded the capacity of any single agent. It is not surprising that, to the extent there was a feeling of being unable to suggest courses of action for the future, all the difficulties and responsibilities were laid at the doors of government.

All this is revealing and significant. People are not used to looking at the situation as a whole, or trying to judge a big picture, as they have no means for doing so, and different people necessarily have limited experience. Furthermore, it is hard, or impossible, for them to understand the general direction of the Québec government, to say nothing of that of the federal government.

We are convinced the Québec government should take the initiative. We were able to take some ourselves within the terms of our mandate, and we were gratified at the enthusiasm and interest even those limited initiatives provoked, as well as the additional initiatives they stimulated. It would be enlightening to review the press reporting on the Projet Saint-Laurent. We believe it would show that conditions are favourable for a development program and for concerted efforts.

In particular there was warm reception for the establishment of a St. Lawrence-Great Lakes Maritime Forum, a working group of representatives of American Great Lakes states, of Ontario and Québec, the governments in Ottawa and Washington, and the private sector.

The consultation and the work of the various sectors of the Task Force produced a number of suggestions which we plan to take up. But as we were preparing our report, there was one point on which there was clearly common agreement: Québec should acquire the means to carry out a comprehensive action program. This necessity seemed justified by the expectation of coordinated action in many fields, by the lack of agencies dealing with major questions, and even more, perhaps, by the need for a lasting recovery. We would therefore like to take up some general directions before coming to specific recommendations.

Below are some of the elements of a strategy that should be part of a government policy for development of the St. Lawrence, whether it applies to natural resources, to its advantages in tourism and recreation, to its many ties with Québec life, or to its role as an international trading and commercial route. But first we would like to mention the general thrust of the strategy elements that will be proposed.

Development and Cooperation

The very theme St. Lawrence development as an early action program for the Québec government suggests that, on the one hand, sufficient attention has not been paid to this thus far, and on the other, that only comprehensive action can cope with and solve the different sectoral problems.

The St. Lawrence, a marvel when it was discovered, has gradually been transformed into an obstacle to be overcome in the building of transmission lines, in the battle against flooding, in developing winter navigation, in the building of bridges and in the operation of ferry services. No doubt there is a reason for this change in attitude, but we would be wrong to allow ourselves to be carried away by these considerations. We should set our sights on the privileges we have, living on the shores of such a River, and be less concerned with the problems of making the most of our geographical situation and the River's wealth. Whether it involves trade and commerce, cultural life, environment and wildlife resources, water, or recreation and tourism, we think it is essential to have the spontaneous commitment of all elements concerned.

We recommend without reservation that the government first of all take steps for rapid development of the St. Lawrence so that there will be general recognition of its contribution to Québec life, of the wealth it contains, of the problems connected with exploitation of this wealth, and of the ways whereby Quebecers can make better use of their great River. We turn to the government because there is no other agent that can be such an effective catalyst for the recovery, and because it is natural to expect it to set an example and to initiate general guidelines for sectoral or collective action. There is no lack of motivation for governmental action: the territory, the boundaries, agreements with bordering states, the natural resources and their conservation and use, economic balance, general relations with culture, transport and ecology, and the reputation of Québec.

In point of fact the Québec government and its public services have already been active in a number of areas. But because there has not been a general policy based on the St. Lawrence and its resources, the effect of government action has been dissipated and the lack of coordination clearly felt.

This, in a word, is the core of the problem: comprehensive development and the public good, failing which one loses sight of the ultimate objectives of all sectoral action and the need for coordination. In short, if the St. Lawrence and maritime activities are considered a natural resource, then proper management of this wealth calls for collective means of recovery and avoidance of difficulties that are the inevitable consequence of inadequate coordination.

First of all, what about the territories along the St. Lawrence?

3.1 Integrity of Québec Territory

Several years ago the Study Commission on the integrity of Québec territory, the Dorion Commission, took up the question of federal property in Québec. It was noted that the Ottawa government was especially attracted by the regions bordering on the River. Whether it involved port development, preservation of wildlife and the environment, promotion of tourism or trade, or development of historical sites, the St. Lawrence and its islands seemed to be a favourite field of expansion for the federal government. Moreover, through purchases by mutual agreement of the land in question from the private sector, the federal government acquired an impressive stretch of shoreland, along with authority over this land, far more extensive than that possessed by the Québec government. At times acting through third parties, and with little or no consultation with Québec, Ottawa thus acquired jurisdiction over some of the best territories, for which Québec still had to do the planning... until it discovered that its own jurisdiction had somehow vanished.

There are many instances of this: cap Tourmente, Isle Verte, the archipel de Mingan, Îles-de-la-Paix. At the present time quiet purchases by mutual consent are being made along the St. Lawrence, especially in the lac Saint-Pierre region, where Grande Île has already been acquired and negotiations are going on over Île de Grâce. Furthermore, Environment Canada has a shopping list of at least eight other locations (wildlife preserves), without mentioning historical sites or future parks.[1]

The Québec government declared in 1974 that, for effective management of its territory, that government must exercise control and jurisdiction over its territory, and especially over the ownership and the use of space that is subject, or might be subject, to a transfer of jurisdiction to the federal government.[2] Only when it is fully aware of the problem, and adopts a strategy and means of putting it into effect, will Québec be able to avoid a repetition of the "Mingan affair", with consequences that impinge on the integrity or jurisdiction of the Québec government.

This is a good place to point out that the status of property along the St. Lawrence is not fully known. There are no doubt several departments that have reliable data, and it is possible to get verification on specific points. But there is no accurate picture of the situation as a whole. Also, there is a problem with the legal demarcation between the public and private domain. In Québec this demarcation is still regulated by the Marine Ordinance of 1681, which hardly any longer corresponds with the present situation or current practices.[3] The mean high water mark can now be scientifically defined on the basis of

1 Environment Canada, Québec Region (1983), *Regional Strategic Plan*.

2 Ministère des Terres et forêts (1974), *Communiqué*, p. 2.

geomorphology and plant ecology, taking into account the fact that high tides occur in May and November, and not in March. This prior demarcation of public domain and private land is basic for establishing a policy of shoreland protection and management.

Once the limits have been drawn, there should be a survey of property titles of the lands adjacent to the River. Many of the titles, especially in the port areas, are not clear. In 1979 there were no cadastral surveys in most villages of the Basse Côte-Nord; development was hit-and-miss. On the basis of the recommendations of the Lower North Shore Task Force[1], the ministère de l'Énergie et des Ressources has begun to straighten out the situation. It should do the same work for the entire corridor.

It seems that some of the lands now occupied by the national ports have never been transferred, rented or bought. In addition, when port installations are moved, the abandoned port sites are not returned to the province as they should be, since federal property is normally used only for designated purposes. Instead, in line with the land administration policy that Ottawa quietly adopted in 1975,[2] the federal government has taken advantage of the situation to move into urban or other projects with hardly any consultation of provincial or municipal authorities. This is the way an ultra modern and artificial enclave, poorly integrated into the historical city, has been created in Québec City.

In future, when the federal government asks Québec for land for enlarging port installations, it would be advisable if this were done on the basis of an exchange: any areas not needed for port activities would be returned to provincial administration.

Should Québec government departments and agencies have an acquisition policy with respect to strategic sites? Unquestionably, as experience shows that without such a policy Québec territorial integrity is threatened by gradual encroachments, and that these encroachments can only complicate the problem of orderly management of river resources.

To be sure, Canadian constitutional law, which is very complex, must take account of the extensive powers the constitution reserves, or attributes to the federal government in matters of property, expropriation, navigation and transport. Moreover, legal practice has created a number of precedents; but all this does not excuse us from studying these questions further and bringing out the essential elements. It is one thing if Québec's rights in a particular matter affecting the St. Lawrence are not well known. But it is quite another not to be deeply concerned and involved in these matters, when there are grounds for fearing that the consequences will seriously affect Québec's capacity to administer its own activities in river and maritime resources. All this should be resolved by early and continuous negotiations.

It is clear that the shoreline of the River and the islands, apart from the questions of territorial integrity and ownership, requires special attention. But we will look at it as a first step in the coordinated development of all river resources.

3.2 Coordinated Development of River Resources

3.2.1 Conservation and Management of the Shore and Islands

The Québec littoral is more than 9 000 kilometres,[3] which makes Québec the most maritime of Canadian provinces. Nearly half the shore, or 4 183 kilometres, is along the St. Lawrence and the Gulf. Following the example of a number of American states, and of France and Ontario, Québec is preparing a conservation and development policy for the littoral and the islands. Like the American states, which can invoke the Coastal Management Act, and France, which has a Conservatoire de l'espace littoral et des rivages lacustres, Québec should have an official document that sets out Québec government guidelines on the waters, shores and islands of the St. Lawrence. This would help to establish overall zoning for nature and wildlife preserves, for port zones and for urban and protected zones.

Changes in this area are not easily reversible. One must proceed wisely, and very prudently. Nevertheless, the stakes are so important that it is hard to understand why there should be any further delay, when land, water and territory are at issue.

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1 *The Lower North Shore, Towards the future*, (1980), Gouvernement du Québec, Conseil exécutif, Éditeur officiel du Québec, 42 pp.

2 Treasury Board, Ottawa, *Federal Land Management*. Circular No. 1975-80.

3 Conseil Consultatif de l'Environnement (1984), *Base d'une politique de conservation pour le littoral du Québec*, p. 22.

Six years ago, in 1978, a study commission on the St. Lawrence recommended setting up a shore conservation program for public and private lands:

> The St. Lawrence River Study Commission recommends preparation of a comprehensive shore conservation plan on the basis of existing data on recreational and wildlife potential, as well as data on sites with an historical, natural or ecological interest. The plan should list sites where action is required, with recommendations for the kind of action on each one.[1]

It is important to follow up on the recommendations of this committee, *inter alia*, by the formation of a body that will deal particularly with the littoral. The Conseil consultatif de l'environnement suggests that a decision-making body be set up for a limited time:

> This body could delineate the Québec coastal zone in the field, delimit the public property line, carry out zoning of the coastal zone in collaboration with the MRC's so as to identify vulnerable and vital areas such as wetlands.[2]

With respect to tidal flats and marshlands, if the Québec government does not act quickly, the federal government has already expressed its intention of occupying the land in its stead.[3] The matter of access to the littoral will be dealt with further on under the heading "Recreation and Tourism".

In order to protect both its jurisdiction and its environment, Québec therefore has every interest in using its resources and authority to set up and implement an active coastal zone policy. Even the American states that normally resist any planned approach to land use make exceptions in the case of coastal zones.

Awareness of the importance of the coastal zone and elaboration of programs to protect and administer such areas, important as they are, nevertheless are only elements of a more general strategy that should be set up for the St. Lawrence corridor. The volume and quality of water, conservation and exploitation of wildlife, development of the cultural heritage, outdoor recreation and tourism, commercial and sport fishing, as well as industrial and port development are also fields in which Québec should become active before somebody else does, in a way that will not necessarily be to Québec's interest.

Photo: Collection Musée de la civilisation

Unless those Quebecers involved know what they are doing, what is to become of the shores and islands of the St. Lawrence?

3.2.2 Water Volume and Quality

Questions about water flow in the River are becoming increasingly important: eventual diversion of water from the Great Lakes, withdrawal of increasing quantities of water from the upper basin for consumer use, or climatic changes that might lower the average flow of the St. Lawrence. The government should become more deeply involved in this area, evaluate the social and economic impact of reduction in the river flow, and maintain closer relations with the body responsible for dividing boundary waters, that is, the International Joint Commission, and also defend its interests before other agencies concerned. Québec and Ontario both reaffirmed their jurisdiction over water matters at the June, 1984, conference in Toronto on Futures in Water. It should also be noted that in January, 1984, the Canadian government set

1 Report, Op. cit., p. 179.

2 Conseil Consultatif de l'environnement (1984), *Base d'une politique de conservation pour le littoral du Québec*, April, 1984, p. 98.

3. Environment Canada, Québec Region (1983), *Regional Strategic Plan*.

up an Inquiry into Federal Water Policy (Pearse Committee) whose mandate is to work out an action strategy for dealing with problems involving Canadian waters. A synthesis of the public hearings was published in April 1985.

Water control and flood prevention sometimes require construction of flood control dams. Works of this kind can have a major impact, and should be authorized only after their probable effects have been assessed. Projet Archipel, one of whose objectives is water control, has made this possible for the Montréal region; it can thus be taken as a model.

There are two departments that deal with water quality in the River (Environnement Québec and Environment Canada) and both have the same objective: elimination of industrial, municipal and agricultural pollutants. Ottawa has already drawn up a plan for organized action, which will ensure interdepartmental coordination, and serve as a basis for discussions with Québec. As far as Québec is concerned, water quality in the River, to the extent that pollution comes from Québec sources, will depend on the degree of success of the three phases of the water purification program — municipal, industrial and agricultural. The main elements are now in progress: construction and operation of treatment plants in the MUC and the QUC, as well as at Trois-Rivières; modernization of the industrial sector, along the lines of the pulp and paper plants; better management of agricultural lands (soil conservation, waste control); reforestation of river banks, and maintenance of the water retention capacity of forest lands.

Any approach to the question of toxic substances in the St. Lawrence must recognize that these substances come in part from the Great Lakes, and also that the sources of pollution fall under several jurisdictions. The interprovincial or international character of toxic pollution of the St. Lawrence could eventually lead to something like the Canada-Ontario agreement on Great Lakes water quality, under which the federal government gives Ontario financial assistance to meet its international obligations in water purification. The president of the Québec Chambre de commerce, Mr. Charles A. Langlois recently wrote us:

> It is essential that this pollution cease, and that water treatment plants be built, especially in the upper reaches of the St. Lawrence in Québec, and in its tributaries. Nor should we overlook the amount of pollution that comes from the Great Lakes. That is why there should be discussions with Ontario and the government of Canada so that coordinated action can be taken to control this source of pollution.

Furthermore, American and Canadian specialists of the International Joint Commission are becoming more and more concerned about water quality in the River. Up to now, the Commission's research budget has been devoted mainly to studying the situation in the United States and in Ontario. But Mr. Charles Bédard, one of the three Canadian commissioners, explains:

> Since our approach is one that deals with the ecosystem in its entirety, we tend more and more to consider the St. Lawrence River, into which the Great Lakes flow, to be the sixth segment of this water system, and we should seriously look into its progressive deterioration.[1]

1 *Le Devoir*, May 29, 1984.

It may be expected that when the Canadian-American Agreement on Water Quality in the Great Lakes is renegotiated, there will be proposals to include the Québec part of the St. Lawrence which is affected by international toxic pollutants. Québec would do well to study the short and long-term implications of such a development, and be ready to defend its positions when the time comes.

3.2.3 Fauna

Efforts to clean up the waters and preserve river banks are also important in the preservation of animal life, as this includes habitat protection. Wildlife conservation, in fact, primarily entails preserving habitats. Encroachments on regions that are habitats for both flora and fauna usually occur in urbanized areas. The result is often disappearance of spawning and nesting grounds and a reduction in food supply.

In view of the importance that Fisheries and Oceans Canada attaches to habitat preservation, and also in view of the priority Environment Canada gives to preserving the wetlands along the St. Lawrence, it is likely that if Québec does not act, Ottawa will. It is up to the ministère des Loisirs, de la Chasse et de la Pêche to make an inventory of potentially interesting sites, for both migratory birds, and fish and batracians, and then to protect and develop them. Establishment and management of these sites might be entrusted to specialized agencies such as Ducks Unlimited or Duvetnor.

As can be seen from MLCP master plans, there are many smaller sites that are vital for wildlife survival. For the most part they are on private property, on Hydro-Québec lands, and even on municipal land. The government should work out ways that would encourage owners to protect and develop these sites. This could take the form of technical assistance, initial subsidies, or fiscal measures.

Setting up the Fondation pour la conservation et la mise en valeur de la faune et de son habitat[1] is certainly a step in the right direction, and should be completed by an investment program for those needs already identified.

1 This foundation was proposed in the Act respecting the conservation and development of wildlife, assented to December 21, 1983.

Finally, we should keep in mind that preservation of animal life and its habitats has not only an ecological importance, but also an economic one because of the contribution that hunting and fishing make to the Québec economy. Improvement of water quality could also lead to a revival of sport fishing on the River and in the Gulf of St. Lawrence.

3.2.4 Cultural Heritage

Development of a cultural heritage is not easy. In the normal course of events, we protect and value a heritage, even if it seems to have little practical use. Skills and knowledge handed on from generation to generation are usually kept and developed because they are useful and have stood the test of time. The same is true of any property that is not too old. But this is no longer the case if an object or a custom is more or less outmoded. Unless its values are really appreciated, it is easily exchanged or destroyed without any scruples, especially if there is some benefit to be had from making the change: replacement, enrichment, freeing space, etc. Why keep up an old pier that stands in the way of timely modernization?

A great deal of work has been done up to now on the inventory and mapping of natural and historical sites in the St. Lawrence corridor. The most urgent tasks, however, are to protect by classification or recognition, to organize and to develop.

This is a consideration that must be kept in mind in connection with development projects — urban, industrial, port or road. We should avoid complete destruction of monuments and places that are important in our history and culture. Archaeological digs will turn up documents and objects that are extremely valuable for our cultural history. But these excavations often have to be done in a hurry and can only salvage evidence from the past. Restoration, study and display of these vestiges of the past have to be left for much later, so that it is only with much delay that these fortunate discoveries will enrich the Laurentian cultural heritage and those belonging to it.

There are solid reasons for stepping up our efforts to develop the many sites and objects that have been discovered in the St. Lawrence corridor. This concerns our culture and what it has contributed to the development of Québec.

We should also think of the attraction that well managed historical sites have for tourists. But the most rewarding result is the interest and activity generated in a community when it preserves its past, its values and its traditional way of life.

Urbanization, industrialization and the growth of land and air transport have all tended to obscure Québec's extensive traditional maritime culture. Former objects and ways of thinking have fallen victim to the new trend of forgetting. At the time when we would like to draw strength from centuries-old experience of the River and the sea, mentalities have changed, evidence from the past is no longer there, or when it is, it is in sad condition; our maritime history no longer has meaning, and there is no interest in returning to it. The Commission des biens culturels was generally pessimistic in its recent evaluation: the maritime tradition is fast disappearing, and it is urgent to put a halt to this.[1]

Accordingly, our maritime cultural heritage must be protected, regardless of cost. There must be more research, more inventories, more rescue work, which will be at a cost that leaves little room for development. This is a weighty responsibility, but one that must not be neglected. In October 1984, the Commission des biens culturels held a first international conference on Québec's maritime traditions, bringing together some fifty researchers; it proved a very successful initiative.

The ministère des Affaires culturelles has made an inventory of all cultural assets, and it realizes what an attraction the St. Lawrence is. But there is no special program to develop the maritime heritage. There are not many interested groups outside the department, and these few are poorly coordinated. We believe it is important to do more to preserve and develop the maritime heritage. Some of the useful steps include better information, more regular public activities, specific mandates for bodies equipped for development activities, and adequate financial assistance to support promising initiatives. And of course a comprehensive plan would be extremely useful.

At the same time, we should not lose sight of the fact that the maritime heritage is just one aspect of the Laurentian cultural heritage.

1 Commission des biens culturels du Québec (1983), *Le patrimoine maritime au Québec, État de la situation et recommendations*, Report prepared by François Picard, 60 pp.

Photo: Ministère du Loisir, de la Chasse et de la Pêche

3.2.5 Recreation and Tourism

Wildlife preserves, ecological centres and cultural heritage developments in themselves are attractions for tourists and those who love the outdoors. But visitors would also like to be able to use the green spaces along the River where they could relax, launch a boat, or camp.

Installations and facilities are important for all of these. These are as much investments in Québec's health, culture and economy as they are investments in the tourist industry. The immediate objective is to develop the attractions and make them accessible to users. A number of access points to the River could be set up by the RCMs, the municipalities or property owners, with the government helping to get them started, ensuring proper road signs, and making provision for fiscal measures if appropriate. Managing them could certainly be left to the owners.

There are already some major facilities: on the Îles de Boucherville, at Montmorency Falls, in Bic park. Moreover, the Projet Archipel has provision for several access points to the River on the Island of Montréal. But there are a number of other places where the potential could be further developed: the Îles de Sorel, Grosse Île, Mingan, Anticosti, to mention only a few. And indeed, how many possibilities exist in most of the cities and villages located along the St. Lawrence!

Clearly, there is much to be done in developing a network of marinas and other harbours, where municipalities and yacht clubs could play an important part. In this connection, the profitability of cruises and excursions on the St. Lawrence should be thoroughly looked into. A ferry service connecting Gaspésie, Anticosti, and the lower north shore would open up both banks of the St. Lawrence, and certainly be an attraction. The chairman of the board of directors of the Société maritime March Ltée, Mr. Pierre Camu, has suggested:

> A return to river navigation for passengers with automobiles, trucks and buses, and stopovers at Québec ports with car ferries, from Montréal to Blanc-Sablon, including the Îles-de-la-Madeleine and Anticosti, as well as Corner Brook in Newfoundland.
>
> It would be interesting to combine chains of hotels and inns, stopover ports and passenger ships into a single organization. The C.S.L. formerly did that, but only in the summer.

One thing is certain: with tourism by road that can draw on a surrounding population of tens of millions of people, and with close to a million pleasure craft along the River, there is a tremendous potential for outdoor recreation facilities on the St. Lawrence, and this should be actively promoted. Quebecers should be encouraged to develop their entrepreneurship in this field.

For outdoor lovers and tourists, an improved network of marinas and more chances for cruising.

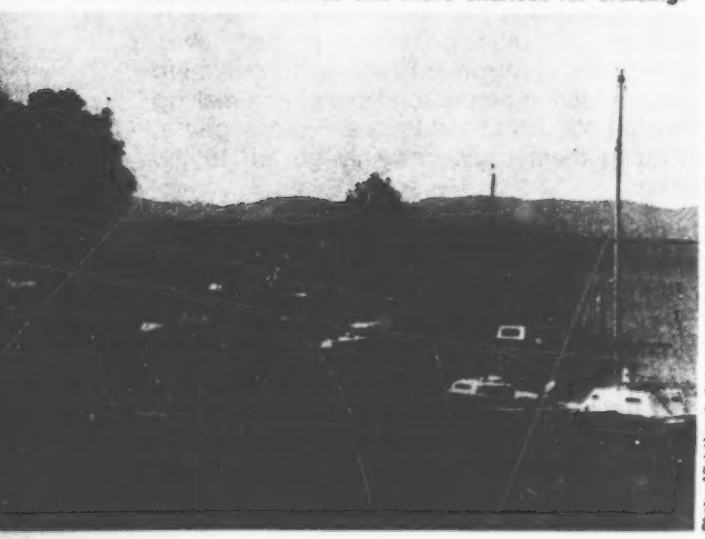

Photo: Ministère du Loisir, de la Chasse et de la Pêche

3.2.6 Hydroelectricity

Hydroelectricity power, or "white coal" as it was called when coal was king, is one of the great riches of Québec. The direct and indirect expenditures in Québec in 1983-1984 as a result of Hydro-Québec activities have been estimated at nearly $4 billion. This is enormous. It can also be said that, wherever Hydro-Québec is active anywhere in the St. Lawrence basin, it has some effect one way or another.

For the time being, it seems that only one major hydroelectric project is contemplated for the St. Lawrence: harnessing the Lachine rapids.

Even if this project should be profitable from the standpoint of energy production, the counter balancing negative effects it might have on the ecology of the St. Lawrence waters, and on the populations that use the watercourses and the shorelines, would have to be carefully weighed. It is quite evident that there are important ecological and economic benefits from using this space for outdoor recreation.

Hydro-Québec also operates thermal plants on the shores of the River, and others may be built. The shores of the St. Lawrence were selected as the operations need enormous amounts of water for cooling. When this water is returned to the River, it has a higher temperature than the water it goes into. This has a major impact on the water environment, and this impact must be carefully measured. Perhaps this heated water could be used to heat buildings, or greenhouse complexes, for instance.

Stringing high voltage lines across the River, or laying submarine cables, must be carefully planned to avoid creating obstacles to navigation, or making unsightly changes in the landscape. Any new development should provide for the eventual needs of marine transport: bigger vessels, tall ships, transport of tall oil-rigs, etc. Already the Île d'Orléans power line and the Québec bridge restrict traffic.

When it comes to harnessing the tributaries of the north side of the St. Lawrence, every precaution must be taken to minimize negative impacts on salmon and on the estuaries, by not diverting the courses of major rivers, by facilitating the passage of fish above the dams, and by regulating flows to meet the minimum requirements of animal life.

3.2.7 Commercial Fishing

We have already pointed out that a rational development of fisheries must be based on a thorough knowledge of marine life and the estuaries, and on the ecology of the fish populations. Knowledge of this kind can only be acquired through a continuing program of serious research in oceanography and marine ecology. Québec must build its own expertise in this field. It will have to develop and consolidate the MAPAQ research teams and those of the university complex at Rimouski. The teams furthermore have to be provided with the necessary research equipment. Since the coastal zone extending over hundreds of kilometres is the critical one, present researchers say they prefer two 13.7 metre (45 feet) laboratory ships rather than one vessel 19.3 metres (65 feet) or more. These ships would be better adapted to their specific needs, and research would be enhanced by having two vessels.

It would also be important for experts to carry on their training to graduate degrees. The marine resources study group of the Université du Québec à Rimouski has said that management of maritime resources should be given special attention in academic programs.

There is a need for research and pilot projects in aquaculture. Mussels, salmonids (sea trout and salmon), sea urchins and even lobster seem to offer interesting possibilities in this field.

Québec should try to get its fair share of fish catches from the resources of the Gulf, as compared with the other maritime provinces. This share could be pro-rated according to the length of each province's shoreline of the Gulf. This criterion is important because in general it determines the number of communities that can live from fishing along the Gulf. Fishermen from Nova Scotia, Newfoundland and part of New Brunswick now have greater access to Atlantic waters. Quebecers should also have a place there, providing they have the proper kind of equipment.

Fishing equipment in Québec, especially the boats, must be modernized. New fishing vessels should be well adapted to the kind of fishing agreed upon by the government and the fishermen. Multi-purpose 13.7-metre units seem well adapted to coastal fishing, while 20-metre trawlers seem more suited to fishing in the centre of the Gulf. Larger ships, even factory ships, should be considered for fishing outside the Gulf since the quality of fish delivered depends on them. Everyone knows of course that the quality of a marine product is a key factor in the development of fisheries.

We should recognize that modernization of Québec's maritime fishing fleets, of its processing industries and the marketing of its marine products is being vigorously pursued. Nevertheless, as was pointed out in the sectoral conference held at Gaspé on April 28 and 29, 1978 (published by the Secrétariat des conférences socio-économiques) much remains to be done, and there should be no slackening of effort.

Commercial fishing is not only a matter of natural resource management and of the economy. It is food, thousands of jobs, international trade, and a way of life. If there is a key element in the development of the St. Lawrence, it is the establishment and rational development of a fishing industry where those engaged in it do more than carry its burdens.

There have been a number of proposals for putting maritime fishing on the economic development agenda:

— tie Québec maritime fishing in with the maritime equipment manufacturing industry;

— modernize fish processing plants so as to promote the processing and preparation of ready-to-eat foods;

— improve the quality of marine products through better equipment for boats and processing plants, and by rebuilding piers and other port installations.[1]

A number of projects are now being studied or carried out by the ministère de l'Agriculture, des Pêcheries et de l'Alimentation. There is a clear determination to develop this sector of our economy. For future steps, it has been suggested that we should:

— learn proper "cultivation" of the Gulf of St. Lawrence in order to feed our own population. This calls for better product quality, opening of new markets and emphasis on marketing;

— emphasize profitable species such as crab, shrimp, lobster, burbot, etc.;

1 MICT (1982), *Réflexions sur un programme d'actions et de recherches à entreprendre en vue de favoriser l'avancement du Projet Saint-Laurent*, edited by Ronald Doucet.

— prepare, in the medium term, for operations on the Atlantic coasts;

— develop aquaculture;

— develop a modern export industry that can compete with the Atlantic region;

— finally, increase the number of fishermen-operators, and assist them if need be, for example in the purchase of boats.

Furthermore, Québec should assume its full responsibilities in the fisheries field.[1] In the past ten years a number of projects have been shifted from one authority to another, to the detriment of the ultimate development of this industry.

The importance of fisheries should not be underestimated. Québec, like the riparian Great Lakes states, can derive substantial social and economic advantages from them. Great Lakes fisheries have grown rapidly and generate about one billion dollars of related business a year.[2] Plainly put, commercial fisheries are a huge and favoured domain in which there are direct benefits to fishing communities, to Québec society as a whole and to the Québec economy.

3.3 A competitive Commercial Artery

If development of the natural resources of the St. Lawrence requires above all concerted action by Québec agencies, the development of the Laurentian corridor as a commercial and transport thoroughfare — especially international — calls for concerted action by private and public groups throughout the entire Great Lakes-St. Lawrence system. The St. Lawrence in fact is a link in a vast commercial transport chain extending from Western Canada and the United States, through the American Midwest and Canadian Prairies, Ontario, Québec and the American states bordering the system, to the Atlantic coast and overseas. Consequently, planning for the development of Laurentian maritime transport and commerce cannot be carried out *in vitro*, but must also be done in terms of the many links in the chain.

There are many different modes in the commercial chain on the strictly transport side: road, rail, sea and air, and even transmission by pipeline. This is already a huge service industry that exists because of the needs of industrial and commercial customers who wish to move their products, merchandise and people from one place to another. The first goal in developing the Laurentian commercial thoroughfare would therefore seem to be to offer customers the most efficient transportation possible, at the lowest cost. Promotional efforts should bring this to the attention of all potential customers. To be sure, it would be a mistake to launch an extensive promotional campaign without a sound product and a full understanding of that product and any rival products. The Québec government is just learning its way in this field.

It is quite clear, and very understandable, that the federal governments, on either side of the border, will not promote one route over another. If a special effort were made to push the Great Lakes-St. Lawrence route, there would be a hue and cry from interests in the Gulf of Mexico, and the East coast of the United States or Canada. In other words, if we want to develop our business, we are going to have to do it ourselves. It was, in fact, this legitimate concern that gave rise to the St. Lawrence-Great Lakes Maritime Forum.

3.3.1 The St. Lawrence/Great Lakes Maritime Forum

Prompted by the Projet Saint-Laurent, the American Great Lakes states, Ontario, Québec, the governments in Ottawa and Washington, and private interests agreed to work together to achieve two objectives: efficient commercial transport at the best possible cost, and promotion of the St. Lawrence Seaway. To this end the St. Lawrence-Great Lakes Maritime Forum was created at Québec in October 1983.

The constitution of the Forum was a direct outgrowth of a seminar held at Québec June 7 to 9, 1982, on the theme "The St. Lawrence-Great Lakes System: continental gateway to America", which was attended by 400 participants. The first discussions were between representatives of Québec, Ontario and the Great Lakes Commission, on which eight American

1 Proposed legislation is now being studied that will assert Québec jurisdiction over the sea bottom.

2 According to Carlos M. Fetterolf, director of the Great Lakes Fishery Commission, Ann Arbor, Michigan. See Carlos M. FETTEROLF Jr. (1979), "Why a Great Lakes Fishery Commission and Why a Sea Lamprey International Symposium", in *Proceedings of the Sea Lamprey International Symposium* (SLIS), Northern Michigan University, Marquette, Michigan, July 30-August 8, 1979, p. 1592: "The combined total economic impact of the recreational and commercial fisheries is about $1.16 billion annually."

states are represented: New York, Pennsylvania, Ohio, Indiana, Illinois, Michigan, Wisconsin and Minnesota. Twelve governments and twelve commercial and maritime agencies are now active in the Forum; these include the St. Lawrence Seaway Authority (Canada) and the St. Lawrence Seaway Development Corporation (United States).[1]

3.3.2 The Infrastructures

The first requirement for an efficient transport system is a successful intermodal combination for each type of merchandise. For bulk shipments, the combination of unit trains, lakers to the St. Lawrence, and then large ocean-going vessels seems the best. For containerized cargo, a more desirable combination is truck, rail and ocean-going vessel.

Further, there is a close link between the quality of infrastructures and their efficiency. If a railway is to be profitable, tracks must be maintained, and there should be an ample supply of flexible rolling stock. Similarly, congestion in the Seaway must be avoided if the productivity of lakers is to be maintained or increased. Efficiency requires anticipating and correcting as quickly as possible any shortcomings in the port infrastructures or their management; this also applies to turntables connecting maritime with land transport, or vice versa. Finally, experience has demonstrated that regular maintenance of channels and locks, carefully placed buoys and navigational aids, especially ice breaking, contribute a great deal to the reputation and efficiency of a commercial transport system. When it comes to infrastructure, vigilance brings rich rewards. We cannot insist too strongly that the efforts made thus far in the St. Lawrence infrastructure system should be maintained and that, whenever necessary, suitable steps should be taken if any serious failures or shortcomings are noted.

Projet Saint-Laurent has organized an international meeting on Winter Trade and Navigation on the St. Lawrence. A survey of a number of countries has revealed that in some instances there is a glaring lack of knowledge about the quality and efficiency of the measures taken to ensure maritime trade and navigation on the St. Lawrence. The meeting was held at Québec, February 6-8 1985; it was warmly received by more than 300 participants, who insistently expressed the wish for similar meetings in the future.

Once infrastructure quality has been assured, the next question is to make certain that user fees are competitive with other routes. This is particularly acute in relations with the United States. Ontario and Québec on the one side, the Great Lakes states and their principals on the other, should cooperate closely to ensure the same advantages on both sides. Naturally, there should be no haphazard structuring of costs on either side — for example, if there should be increased user fees on one side of the border or the other; the main thing is to achieve cooperation that will retain the competitive capacity of the Laurentian route. If user fees on the St. Lawrence-Great Lakes system should exceed those of the Mississippi-Gulf of Mexico system, it is obvious this will greatly reduce the strategic advantages of the Laurentian route.

If they are to make the most of these advantages, members of the Great Lakes-St. Lawrence Maritime Forum should be encouraged to ensure that the laws, regulations and rates do not unduly hamper the competitiveness of the system, however relevant they might be from other standpoints. Further, the members should work closely with users to find out their needs and assist where possible in developing the commercial infrastructure of the system.

The rail infrastructures in Québec are in the hands of two companies, one public (CN) and the other private (CP). The federal government directly and indirectly regulates both, for example, through the Crow's Nest rate structure, the AT and East, or by the Maritime Freight Rates Act (MFRA). Québec should closely follow these regulatory activities and the implications that federal action has for the movement of merchandise in Québec and Canada. It should work closely with users to persuade the federal government to modify regulations if need be, and make the necessary railway investments in the St. Lawrence-Great Lakes system, though without favouring one transportation mode over another.

Québec should take the same approach to the question of navigation aids: dredging the channel, coast guard, icebreaking. There is a shortage of rescue vessels in the St. Lawrence and in the Gulf, and they are badly located,

1 The twelve organizations are the following: Center for the Great Lakes (Chicago), Council of Lake Erie Ports (Cleveland), Dominion Marine Association (Ottawa), Great Lakes Commission (Ann Arbor), Great Lakes Task Force (Ann Arbor), Great Lakes Waterways Development Association (Ottawa), Indiana Port Commission (Portage), International Association of Great Lakes Ports (Portage), Lake Carriers' Association (Cleveland), Association des opérateurs de navires du Saint-Laurent (Montréal), Seaway Review (Harbor Island), and Wisconsin Council of Ports (Madison).

Photo: Port of Quebec

The St. Lawrence is open as far as Montréal for twelve months of the year. Unfortunately for maritime trade, many people are unaware of this. For that reason, the St. Lawrence Task Force organized an international symposium in February 1985, on trade and winter navigation on the St. Lawrence.

considering the density of commercial traffic, the number of fishing vessels and the growing popularity of sailing and excursion boats. In this respect, user safety is often neglected.

Also, icebreakers are not large enough and are badly distributed on the St. Lawrence. It is hard to understand why the largest icebreakers are based at Halifax and Sydney rather than at Gaspé, Sept-Îles and Québec, since the major ice problems are to be found in the Gulf and between the Saguenay and Montréal. In this instance as well, Québec should have a well-prepared case so that, in concert with the users, it can persuade Ottawa to change its dispatching policy.

With the exception of the large private piers belonging to the mining companies and to Alcan, and the Valleyfield and Bécancour ports, the main elements of the port network on the St. Lawrence and the Saguenay come under Transport Canada. The most important ones belong to the Canada Ports Corporation: Montréal, Québec, Trois-Rivières, Chicoutimi, and Baie des Ha! Ha!; Sept-Îles was recently added to the list.

Transport Canada has made a great point about broader autonomy for the ports under the provisions of Bill C-92. In practice, this autonomy seems to be highly selective. There is perhaps greater autonomy in day-to-day management, but the central authority retains the right to decide key issues such as development projects and user fees. The boards of directors are also appointed by the Minister of Transport Canada.

But a port is dynamic to the extent that the local business community is actively involved in it. If we look at most of the big American ports (Long Beach, New York, New Orleans, etc.), we find that they belong to the municipalities and that the federal government has no ownership rights, apart from some military installations. Similarly in Western Europe, the big ports like Rotterdam, Antwerp or Hamburg are integral parts of municipal or regional governments.

Québec should therefore seek to transform its ports into what are called Commission ports, or better still into autonomous ports, like those at Toronto, Thunder Bay and Hamilton, which have very jealously protected their status, despite Bill C-92. In any event, one section of the law provides that a so-called national port can change its status and become a Commission port.[1] Commission ports have much greater autonomy, and in every case the local community is much more involved than when the ports depend primarily on centralized planning.

1 In this connection, see the *Globe and Mail* of March 14, 1985, reporting the remarks of the President of Ports Canada, Mr. Ronald Huntington. He stressed that the intention of the legislature in creating Port Canada was indeed to promote greater autonomy in the ports. He nevertheless wondered whether port administration might not become too decentralized.

The ports at all costs should be brought close to users, and this should be central to Québec policy. At the same time, Québec should study the possibility of encouraging other models, such as those of Bécancour[1] and Valleyfield,[2] which have demonstrated their usefulness.

The Canada Ports Corporation will eventually need new locations which Québec could provide, once the development requirements on the territory for which it is responsible have been considered. An assessment should be made of the needs for new grain elevators or storage for containers or coal, or even for new sites; Québec must secure the support of users in this. But in exchange, Québec must insist on the return of abandoned sites that are no longer used for port purposes. It is for Québec to decide how these should be used, in keeping with developement plans for the surrounding region.

For the small ports and harbours maintained by Transport Canada, Québec should insist that all port installations required for coastal navigation, fishing and boating be kept in good operating condition. This is not always done at present.

In short, development of a competitive commercial maritime artery calls for the most careful maintenance of the infrastructure, and rapid adaptation to changing needs. In addition, the appropriate Québec authorities should promote greater autonomy in port administration in port cities, so that local communities participate fully in the economic development of the port facilities.

Guidelines of this kind should be part of a promotional or marketing plan for the St. Lawrence commercial route.

3.3.3 Promotion and Marketing

Once the infrastructures of the commercial maritime route are in place, the next step lies in promotion and the adoption of suitable marketing techniques.

Because international maritime trade is so important for the St. Lawrence, special attention must be paid to promoting the St. Lawrence-Great Lakes system; the assets of the waterway are really to be found in the entire industrial and economic basin it drains. If Québec acts in partnership with Ontario and the Great Lakes states, it will be able to work out an essential and promising commercial strategy.

The St. Lawrence-Great Lakes Maritime Forum has taken a first step in this direction; it is vital that Québec continue to cooperate fully with all members of the Forum.

Among the promotional material the Forum as already made available are a publication entitled *The Great Lakes-St. Lawrence System* and a film available on video cassettes in five languages, *The St. Lawrence Great Lakes System*. The publication decribes and illustrates the system's region, the St. Lawrence Seaway, the Québec, Ontario and American ports, and international maritime routes. The film also contains comments by international users whose experience should convince anyone of the value of regular use of the St. Lawrence route. The material is directed to the people who decide on and handle cargo around the world. Response in America and in Europe has been very favourable.

A Computerized Transportation Information System that is regularly brought up to date with relevant commercial maritime transport information must be established. Experience in European and American maritime circles has already demonstrated the value of such a system. The only thing remaining to do is to determine what is best suited to local needs and resources. The American (P.I.E.R.S., R.A.T.E.S.) and British (Lloyd's) systems have proven successful; there are others in France, Germany, Holland and Belgium. They should be used, and if possible, supplemented.

There is no doubt that regular traffic on the St. Lawrence could be increased if we were to distribute accurate information about St. Lawrence ports in cities like New York, Chicago, London, Brussels, Antwerp, Rotterdam, Paris, Marseilles and many others, and at the same time collect information of value to Québec maritime circles. There would also be many advantages in encouraging St. Lawrence ports to do their own commercial publicity, as is done by many port administrations in the world.

Does an industrial and commercial network not call for correcting false impressions, such as those about winter navigation on the St. Lawrence, but above all for promoting the port installations, the services, the fleets of vessels available, the prices, the industries and the

1 Port belonging to the Québec government.

2 Port belonging to the municipality of Valleyfield.

goods produced? All this must be brought home to the parties concerned. Maritime trade and transport networks are specialized, smoothly running operations in which partners can be effective only if they participate actively.

The chairman of the board of directors of the group Les Consultants Dessau Inc, Mr. J. C. Desjardins, has said that any team seeking to develop the St. Lawrence potential must, *inter alia*, identify and be in regular contact with important decision-making centres that use the River, and follow their activities. Mr. Raynold Langlois, president of the Montréal corporation for Port Promotion, recently made similar comments:

> It is vital to promote the St. Lawrence artery with the maritime world outside Québec. In addition to the regional, or even port, promotion, the Québec government can coordinate this promotion and disseminate it on a worldwide scale with far more effective means than are available to regional interests.

Public and private enterprises generate traffic and should, therefore, be the targets of promotional activity. The discussions initiated by Projet Saint-Laurent brought this out many times. Mr. Raymond Dufour, a member of the board of directors of the Canada Ports Corporation, stated that a group trying to promote the system's assets should publicize the economical route, and calculate the savings for eventual users. Professor Michel Boisvert of the Université de Montréal also asserted that our first contacts should be with businessmen.

The advantage of the St. Lawrence route could be enhanced by a land bridge between Montréal and Vancouver. Projet Saint-Laurent thought it worthwile to look into this question, even before research and discussion had taken place. It involves a new route, that has advantages over existing ones, for traffic from the Far East to Western Europe, and vice versa. In 1982, member countries of the European Economic Community (EEC) exported about $24 billion US to Asia. They imported $37 billion US from there.[1] More than two-thirds of the exports and four-fifths of the imports involved Japan, the People's Republic of China, Hong Kong, South Korea, Malaysia, Singapore and Taiwan.

Routes combining the Vancouver-Montréal land bridge, crossing the North Pacific and the St. Lawrence route to Europe, can be compared to the wholly sea routes to Europe and Asia, or to the Siberian land bridge. It remains to be seen how the parties concerned can offer and advantageous land bridge for containerized cargo traffic. The Task Force is now looking into this with the agencies concerned, CN, CP, and the ports of Montréal and Vancouver. Projet Saint-Laurent is chairing the working group.

There is no shortage of other promotional and cooperative means which could affect, for example, the grain and coal markets, vital sectors for Laurentian maritime trade. This should probably be the role of permanent sectoral groups. Like chamber of commerce leaders, or those who in earlier days created the Hanseatic League, or those who contributed to the unquestionable success of the Mississippi route,[2] or of the North Sea ports between the Elbe and the English Channel, the St. Lawrence should have its staunch supporters, always ready to breathe new life into it. We like to think that the work of the Québec, Ontario and United States representatives have already built a solid base. The conviction in Québec that the St. Lawrence is — in the words of those familiar with economic development — an excellent asset in industrial location should further strengthen marketing initiatives.

3.3.4 Industrial Location

It is easy to see that the St. Lawrence has a key role to play in the location of certain industries. An obvious case for Québec: the aluminum industry, whose supply and delivery traffic is large enough to warrant special maritime and port installations. It should be kept in mind that aluminum industries are not located solely in relation to hydroelectric supply. But it has often been observed in recent years that there is an underutilization of the River's industrial capaci-

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1 See International Monetary Fund (1983), *Direction of Trade Statistics Yearbook*, Washigton, pp. 60-65.

2 We are speaking of the marketing work done by the Mississippi Valley Coal Exporters Association on coal traffic through the Gulf of Mexico.

3 It should be recalled that in this report the Saguenay is always considered part of the St. Lawrence. With respect to industrial location see, in particular, CAZALIS, Pierre (1967), "Le Saint-Laurent, facteur de localisation industrielle" in *Cahiers de géographie de Québec*. No. 23, September 1967, pp. 327-340; LASSERRE, Jean Claude (1980), *Le Saint-Laurent grande porte de l'Amérique*, pp. 631 ff; DOUCET, Ronald, *Le rôle du Saint-Laurent en tant que facteur de localisation industrielle* (working paper), ministère de l'Industrie, du Commerce et du Tourisme, Québec 1983, 98 pp.

ty.[3] In other words, most of the industries or manufacturers located along the St. Lawrence are not here because of the advantages of this proximity. The St. Lawrence potential is virtually unexploited. This situation is no doubt a reflection of Québec's economic structure. But it does show that there is still an opportunity for development, provided the industrial location advantages of the St. Lawrence are better exploited and used.

Industries geared to export markets have an ever-growing need for industrial port zones. An assembly plant will often attract subcontractors, forming an industrial cluster and increasing Québec's portion of the value added.

It is possible that duty-free zones could promote such installations, and the subject should be studied.

Shipbuilding is an industry that is more directly related to the River, but Québec shipyards will have to diversify into other branches of heavy industry, because of strong competition from countries like Korea. The recovery of commercial fishing, on the other hand, seems to be well under way.

Québec could also gain from transhipment of some bulk cargoes such as coal, grain and oil seeds and processing part of them here for local consumption, or for export. This prospect was very vigorously put forward at the conference on winter traffic and navigation on the St. Lawrence in February 1985. Prof. Jean Claude Lasserre, among others, strongly backed this idea.

The United States is the world's leading producer of soybeans, and seventy percent of all American soy exports are in the form of beans. Québec could profitably get part of its oil and oilcake needs from this, and then export the two products overseas. Extraction of chemicals from coal is also a possibility that could be developed in time.

In summary, the St. Lawrence potential could contribute further to the industrialization of Québec, if the input is from Québec and the goal is overseas export, and further if it involves industries whose raw materials are already carried on the St. Lawrence.

3.3.5 Employment

As the first part of this report showed, the St. Lawrence route involves thousands of jobs as it goes through Québec. Jobs in ports, around ports, and on board ship are directly tied in with traffic on the St. Lawrence. A study commissioned by the Projet Saint-Laurent points out that a 1 % increase a year in traffic on the River, over a period of ten years, could create over 2 700 jobs in Québec.[1]

Montréal, and to a lesser extent Québec, are management centres for maritime transportation and trade. A number of large companies are located in Montréal; even though their business related to the St. Lawrence is marginal, their activities are international. These jobs in the management sector should be treated differently from those in ports or on board ship. Certain fiscal measures, or more substantive programs in maritime commercial and transport training, could have a greater impact on this kind of employment than the annual variations in various kinds of traffic in Québec ports.

Crew members are in a special position. Most of the Québec crews sail on the Great Lakes and the St. Lawrence, but this could change with the eventual growth of a merchant marine. The new maritime transport code prepared by the United Nations might promote bilateral agreements between exporting and importing countries, which would reserve a share of the bilateral trade for each of their national carriers. A number of countries have signed such agreements. Canada might be obliged in spite of everything to acquire a merchant marine in order to participate in this kind of agreement. Training programs for officers and crews should be maintained, and adapted to international conditions. The possibility of helping maritime circles through a Québec publication for sea people should also be considered. National shipowners could be encouraged to acquire ships built or refitted in Canada. Under certain conditions, they might be authorized to register foreign ships under the Canadian flag.

1 This is the conclusion of the study made by Les consultations économiques Martin in 1983, which we quoted earlier in this report.

There is no doubt that for transportation within Québec, the principle of competition and calls for bids should be maintained as much as possible. Similarly, if the Commission des transports du Québec issues new permits it can only make the maritime sector more competitive. It is normal that these permits and contracts be restricted to firms domiciled in Québec, in keeping with our purchasing policy. In this way Québec firms, which are not protected but encouraged, will be able to develop the commercial know-how enabling them to succeed better in foreign and domestic markets.

In short, jobs connected with maritime transportation in Québec, with industries and businesses related to fishing, tourism and recreation, are very important because they are so numerous, and often well paid. They should be encouraged wherever possible.

3.4 Coordination

The River has many resources, but they are not developed smoothly as a matter of course. There are many people involved in each of the areas studied, and they are accountable to different masters. One is promoting international trade and looking for greater productivity; another is concerned with the number of jobs and employment criteria, and so on through a whole range of legitimate concerns. In addition, there are various fields of action: trade, culture, transport, recreation and tourism, and many others. How can coordination within each of the fields be achieved without encroaching on the jurisdiction of others? And how can there be harmonization of activities of such varied fields of action, often with contradictory requirements?

The first step toward profitable coordination, which would be the most difficult if experience had not demonstrated the need for it, is certainly to point up the benefits of concerted action. Happily, there is no lack of examples of benefits from cooperation among partners. In international trade, for instance, it is clear that regular maintenance of the Laurentian navigation facilities as well as of industrial and port infrastructures goes hand in hand with the development and steady flow of traffic, just as the latter go hand in hand with the development and consolidation of jobs and other local economic repercussions. We should not forget that the ultimate beneficiary is usually the citizen and the consumer in Québec, Ontario and the American Midwest.

The thorniest problems in coordination are no doubt those of the objectives to be sought, and reconciliation of priorities.

This was no doubt the first challenge of this report. Throughout the consultations, studies and activities of Projet Saint-Laurent there was a lively feeling in all circles of a need for greater coordination, for solidly grounded decisions, and for arbitration in certain cases. And more, there was an instinctive reflex to turn to governments, and especially to the Québec government, in the hope of some stimulating and conclusive response from it.

In the overall plan for developing the St. Lawrence, economy, ecology and recreation all have parts to play.

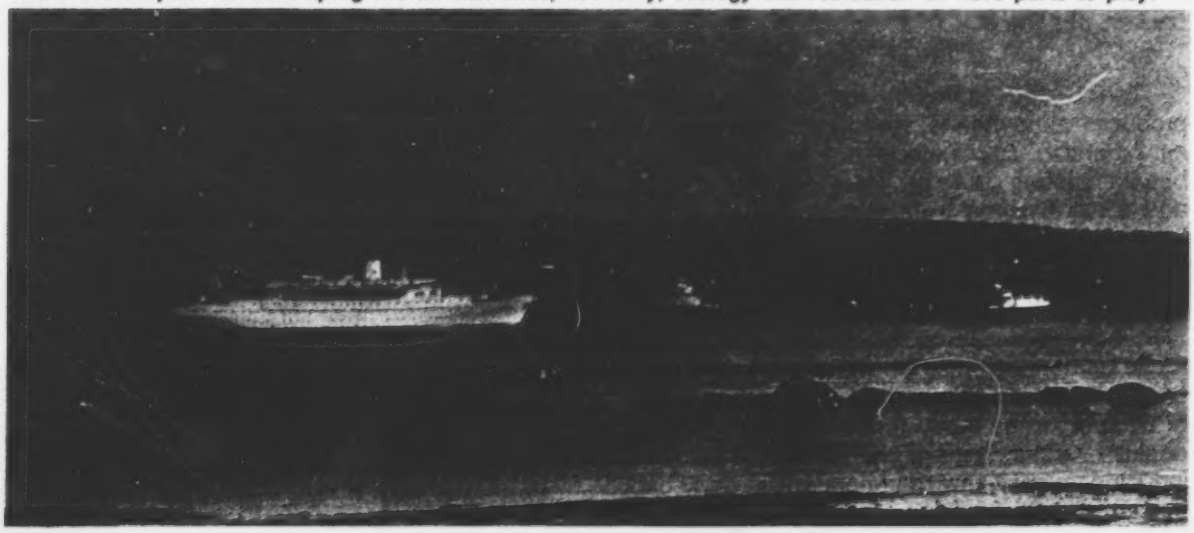

Photo: Jacques Lassard

To tell the truth, this is perfectly consistent with the central theme of this report. How can one recognize and fully accept that the St. Lawrence is a *vital national resource* in so many respects, without at the same time recognizing that the Québec government should shoulder a large part of the responsibility for its development, for the coordination of many activities, and for the stimulation of private initiatives? This approach naturally follows from the economic, environmental and cultural role the Laurentian basin has. There are numerous reasons for government action itself. The territory, frontiers, agreements with partner states, natural resources, their conservation and use, economic equilibrium, job creation, relations with culture, transport and ecology, and Québec's very reputation.

In point of fact, the Québec government and its services have been active on a number of fronts for a long time. But in the absence of a firm general policy based on the St. Lawrence and its resources, the primary reason for governmental action tends to become lost. The very strong statements the Prime Minister recently made in his inaugural address at the last session of the legislature (October 1984) show that the Québec government is indeed determined to lay out an integrated policy for developing the resources of the St. Lawrence.

The Prime Minister voiced the Québec government's intentions in the following terms:

> The Québec government will develop as never before the exceptional asset of this great communications avenue which places Québec at the heart of all movement between Europe and the vast region of the Great Lakes.
>
> ... We must now ensure that Québec will have the necessary expertise so it can act as the motive force for the St. Lawrence, by acquiring the information, promotion and development tools for an asset that will be the envy of many parts of the world.

It may be said that this represents the core of the recovery: general development of all resources. Seen in this perspective, the sectoral objectives become understandable and can be harmonized.

The Montréal Corporation for Port Promotion has grasped the importance of entrusting the development and coordination in question to an agency representative of the Québec government. The Corporation declared in its statement to the Projet Saint-Laurent:

> It is important that the Québec government set up a central body entrusted with coordination of all Québec government activities dealing with Québec maritime activities on the St. Lawrence or elsewhere. This agency should be responsible not only for recommending policy to the government and for coordinating its application, but also for receiving complaints and proposals of private interests and regional governments regarding marine activities. We deplore that at the present time we have to negotiate with several Québec government agencies every time there is a maritime question that involves the government, and that many of these bodies have divergent and contradictory interests.

Because of the importance of the St. Lawrence, we have expressed similar views, and we recommend the formation of an appropriate agency, attached to the ministère du Conseil exécutif, that would be entrusted with facilitating coordination of many facets of government action, and with recommending or carrying out basic government choices regarding the development, resources and maritime activities of the St. Lawrence. This body could be in the form of a secretariat of the Conseil exécutif. It would be concerned primarily with elaborating and implementing a general development policy for Québec river and maritime resources. It would also seek to make numerous public services more readily accessible to interested circles and businesses.

Perhaps in the short term there would be reason to consider a public agency commissioned by the government which, as a corporation within the meaning of the Civil Code, would participate more directly in the initiatives of different groups. This is one of the questions on which a final decision could be made by the secretariat in question.

There is one special responsibility of the secretariat, or the eventual agency, that immediately comes to mind: establishment of a data bank on the merchandise that uses, or could use, the River. A not too difficult beginning would be to make available to Québec business circles, and perhaps to all interested parties, the existing computerized data banks, such as that of the Journal of Commerce, P.I.E.R.S. and R.A.T.E.S., that of Lloyd's of London and the Numerax bank of New Jersey.

But we do not want to put too much emphasis on practical projects. In this latter part we are concerned with the fundamental means of helping all the partners in the management of river resources. In particular, we have advocated some specific measures, which are not expensive, to help the Québec government coordinate the many programs it already has, and to formulate an integrated policy of developing the St. Lawrence as a *vital national resource*.

At the present time, development of the St. Lawrence is not a matter of investments or major projects. There must first come the necessary procedure of coordinating a dozen jurisdictions and hundreds of users, whose operations should contribute to a rational development of the River and its resources.

3.5 Conclusion

It will be easily realized that the main waterway along which the Québec community has settled involves primary resources and collective responsibilities. And since this implies essentially more than just resources, for it really is the driving force behind economic, social and cultural activities, we have thought it only right to call it a "vital national resource". There may have been a pause, or temporizing, in the coordinated development of this asset over the past decades; yet it is not this but rather the enormous potential that must be preserved and developed that will have justified our analyses and suggestions.

Our consultations have shown that there is a deep commitment. Quebecers are certainly keen on the prospect of development and orderly management of river resources. Infrastructures and motivated groups already exist in many areas. Provided shortcomings, improvements or fair benefits can be pointed out, we believe the Québec community is ready to support and join in the efforts suggested in this report.

APPENDICES

APPENDIX I

The Following Persons or Agencies Submitted Briefs During a Consultation by the Projet Saint-Laurent:

Abgrall, Jean-François
Director
GROUPE D'ÉTUDE DES RESSOURCES MARINES

Bastien, Luc
President
CONTREFORT

Bédard, Charles
Commissioner
COMMISSION MIXTE INTERNATIONALE

Berthiaume, Guy
President
SOCIÉTÉ DU PORT DE VALLEYFIELD

Bianco, Fiorino
President
Fédération de la métallurgie
C.S.N.

Blakely, David W.B.
Vice-president
Marketing and Sales
HALCO INC.

Boisvert, Michel
Professor (Urban Studies)
UNIVERSITÉ DE MONTRÉAL

Bouchard, Jean
President
CORPORATION DES PILOTES DU BAS SAINT-LAURENT

Brassard, Gérald
General Director
SOCIÉTÉ INTER-PORT DE QUÉBEC

Brindle, Jean-Rock
Director
Department of Oceanography
U.Q.A.R.

Caillol, R.
Direction commerciale
PORT AUTONOME DE MARSEILLE

Camu, Pierre
First Vice-president
LOGISTEC CORPORATION

Cavey, J.H.W.
President
J.H.W. CAVEY AND ASSOCIATES

Chouinard, Jean-Guy
Port Manager
SOCIÉTÉ DU PARC INDUSTRIEL DU CENTRE DU QUÉBEC

Cook, P.R.
Manager
PORT OF THUNDER BAY

Cornelissen, Paul
Captain and
Tourville, Gilbert
First Officer

Côté, Jacques
General Director
Marketing and Sales
CP RAIL

Coulombe, Guy
President
HYDRO-QUÉBEC

Davoust, Albert M.
Deputy Administrator
LES SILOS PORT-CARTIER

Derome, Louis
Vice-president-Administration
CAST NORTH AMERICA (1983) INC.

Desgagnés, Rosaire
President
ST. LAWRENCE SHIP OPERATORS ASSOCIATION

Desjardins, J.C.
Chairman of the Board
LES CONSULTANTS DESSAU INC.

Didillon, Henri
FÉDÉRATION DE VOILE DU QUÉBEC

Dion, Jean-Marc
Mayor
SEPT-ÎLES

Dolbec, Yvon
President
CHAMBRE DE COMMERCE ET D'INDUSTRIE DU QUÉBEC MÉTROPOLITAIN

Doyon, Clermont
Vice-president
Marketing
MARINE INDUSTRIE LTÉE

Gagné, Jean
Editor
Revue maritime L'ESCALE

Gagnon, Ghislain
Mayor
PORT-CARTIER

Gardiner, D.K.
President
MISENER TRANSPORTATION

Gauthier, Jean
President
SOCIÉTÉ LINNÉENNE SAINT-LAURENT

George, Pierre
Geographer
INSTITUT DE FRANCE

Germain-Simard, Denis
Agent
Eastern Branch Office
CANADIAN MERCHANT SERVICE GUILD

Graillot, A.
Equipment Director
PORT AUTONOME DU HAVRE

Gralewicz, Roman
President
SEAFEARERS INTERNATIONAL UNION

Hamel, François A.
General Director
FÉDÉRATION QUÉBÉCOISE DES ACTIVITÉS SUBAQUATIQUES

Hamel, P. Denis
President
LA COMPAGNIE PRICE LIMITÉE

Hamelin, Louis-Edmond
Recteur
UNIVERSITÉ DU QUÉBEC À TROIS-RIVIÈRES

Hasse, G.
President
ATLANTIC CONTAINER LINE

Hébert, Normand
Secretary-Treasurer
NAVIMAR CORPORATION LTÉE

Hillenbrand, Erich
General Director
KUEHNE & NAGEL INTERNATIONAL LTD.

Hopkin, Elwyn E.
Chief
Grain Transport and Handling
CANADIAN WHEAT BOARD

Junius, Marcel
President
CONSEIL CONSULTATIF DE L'ENVIRONNEMENT

Laberge, Gilles
Industrial Commissioner
CORPORATION DE PROMOTION ÉCONOMIQUE DE LA BAIE DES HA! HA!

Laneuville, André
Urban Affairs Director
TROIS-RIVIÈRES

Langlois, Charles A.
Honorary President
CHAMBRE DE COMMERCE DE LA PROVINCE DE QUÉBEC

Langlois, Raynold
President
Société de promotion portuaire
CHAMBRE DE COMMERCE DU DISTRICT DE MONTRÉAL AND THE MONTRÉAL BOARD OF TRADE

Lasserre, Jean-Claude
Geographer
LABORATOIRE D'ÉCONOMIE DES TRANSPORTS, LYON, FRANCE

Lemay, Fernand
President
FEDERATION OF THE ST. LAWRENCE RIVER AND GREAT LAKES PILOTS

Lemay, Raymond
President
CANADA STEAMSHIP LINES INC.

Michotte, Pierre
Directeur-adjoint
INSTITUT DE MARINE DU CEGEP DE RIMOUSKI

Morin, M.R.
Director
Contrecoeur Terminal
COMPAGNIE MINIÈRE IOC

O'Neil, W.A.
President
THE ST. LAWRENCE SEAWAY AUTHORITY

Ouellet, Marie-José
Sailing Specialist

Ouellet, Yvon
Director
CENTREAU

Parent, Guy
Tourist Services Director
SOCIÉTÉ D'EXPANSION ÉCONOMIQUE
DU SAGUENAY INC.

Paterson, Robert J.
Vice-president
N.M. PATERSON ANS SONS LIMITED

Pelletier, Louise
Marketing Director
FREIGHT RATES CONSULTANTS (G.P.) LTD.

Poirier, J.D.
Sales General Director
Overseas Markets
CN RAIL

Roberge, André
Manager
LOWER ST. LAWRENCE OCEAN AGENCIES
LTD.

Rothwell, D.S.
President
GREAT LAKES WATERWAYS DEVELOPMENT
ASSOCIATION

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APPENDIX II

Considerations on Maritime Transportation and International Trade Submitted to the Sietmo Task Force on Deep-sea Shipping

Maritime Transportation and International Trade

The Task Force on Deep-Sea Shipping created recently by Transport Canada was asked to study the changes that have occurred in the international shipping sector. The Task Force is attempting to determine whether these tendencies are potentially detrimental to Canadian trade and, consequently, whether it is advisable to change present policies and encourage more directly the creation of a Canadian merchant fleet. The St. Lawrence Task Force (Projet Saint-Laurent), for its part, was set up in 1982 by the gouvernement du Québec with a view to examining a strategy for developing the River, particularly in the areas of maritime transportation and international trade. This document is being forwarded by the St. Lawrence Task Force to the Task Force on Deep-Sea Shipping for information purposes.

Québec and Maritime Transport

Québec plays a major role in Canadian maritime transport. Her ports process more than one-third of all the tonnage handled in Canada, and Montréal is the leading port for value of cargo in transit. Québec ports also play a continent-wide role, and Montréal's hinterland for container traffic extends from Maine to the Mississippi. Montréal is also a major management centre in the related fields of maritime transportation and international trade. The major Canadian shipping concerns (CN, CP, Fednav, CSL, Halco, CAST) maintain activity centres, and many other Canadian and foreign companies have important offices in the city.

Also concentrated in Montréal are many large corporations associated with international trade, as well as all the services required for this activity: banks, insurance companies, customs consultants, shipping agencies, maritime and international law firms, etc.

This "corpus maritimus" enables Montréal to play a role of much greater importance than the size of the merchant fleet directly under the Canadian flag might suggest.

Recent Trends

The recent implementation of the code of conduct prepared by the United Nations Conference on Trade and Development (UNCTAD) is already having some effects on international trade. The numerous trade agreements between certain Third World countries and the European Common Market are being reinforced by bilateral agreements on the sharing of maritime traffic. Newly formed or growing national fleets often depend on these guaranteed trade flows to attain minimum profitability. In such a context, Canadian trade breakthroughs may become even more difficult except within long-term agreements, which will probably have to include a maritime component.

The problem already exists with several Latin American countries which require, before granting import licences for their territory, that certain goods be carried by ships of the two national fleets involved. In the absence of a Canadian fleet, some countries conclude that all traffic must be conveyed by ships belonging to their own fleets.

This type of dependence on maritime services whose efficiency is not centred on the needs of Canadian shippers can create serious supply problems. This happens in the case of turnkey projects undertaken abroad by the larger Montréal engineering firms. For instance, the lack of experience of certain national shipping companies in winter navigation and supply logistics can cause cost increases and delays which have the effect of reducing our corporations' profit margins. Ultimately, contracts are lost or neglected to the advantage of competitors who can depend on a maritime sector that they are in a better position to influence.

As far as maritime trade between industrialized countries is concerned, the adoption last year of the Shipping Act in the United States will have the effect of changing the rules of competition by allowing the members of the same maritime conference to modify their tariffs for important clients. Canada must see to it that its main shippers benefit from this relaxation of

the rules of the game, especially since the increasing presence of companies not affiliated with the conferences is changing the international container traffic market as a whole. Many of these new independent or conference-affiliated companies are from Asia: Evergreen (Taiwan), Yang Ming (Taiwan), Neptune Orient (Singapore), etc. They are developing apace, more or less directly spurred by their governments which are attempting to promote shipbuilding and repair activities on their territory. The link established between industrial activity and maritime transport threatens to lead to a form of trade and maritime protectionism. Overproduction of bulk cargo ships and too rapid expansion of certain carriers recently led South Korea to reserve certain strategic goods (oil, gain, iron ore, coal, etc.) for ships flying the Korean flag. These goods now represent 80 million tonnes out of a total 118 million tonnes shipped from or to Korea. If this Korean trend or an extension of the spirit of the UNCTAD code to bulk cargo were to become general, Canada would have to develop the necessary expertise to play up the maritime aspect in its international trade negotiations.

Canada can perhaps do without a merchant fleet flying its flag — a question which remains to be examined in depth — but it certainly cannot do without the expertise that would enable it to assess its maritime and trade needs and interests.

Canada is a leading world-wide maritime shipper, particularly as regards solid bulk cargoes such as grain or ore. Yet the Canadian deep-sea fleet is negligible. This creates a probaply unique gap between total shipments and the tonnage carried under the Canadian flag. However, the situation is less dramatic than it appears, due to the presence, in Vancouver, Toronto, Halifax and especially Montréal, of a business community that has considerable experience in international trade and maritime transport.

It cannot be claimed that Canada has been penalized in the past in the field of maritime transportation and that its trade has seriously suffered. On the other hand, the situation is perhaps changing under the dual influence of increased maritime protectionism on the part of developing or soft-currency nations (USSR, Eastern Bloc) and intense competition between the larger carriers which, in order to lower costs, increase the size of their container ships and reduce the number of their loading ports. On the west coast, Vancouver has already suffered from this reconcentration of traffic over a few ports and, in the east, Montréal could find its situation threatened if the new services introduced this year by Evergreen, Sea Land and ACL between westen Europe and the American east coast meet with the anticipated success.

The situation of world-wide maritime transport has always changed rapidly, but this has not prevented Canadian shippers from holding their own. However, present changes are taking place at a faster pace, and the role of governments is taking on increased importance. To suggest from this that an interventionist policy should be adopted and a merchant fleet created for Canada is a step that most experts hesitate to take. What appears necessary, however, is to conduct thorough studies on the matter. More important still, we should make sure that the impact of maritime transportation on Canadian trade is measured on a regular basis so that action can be taken if necessary.

Henceforth, the main Canadian agencies involved in international trade must, if they have not already done so, hire transport specialists to follow Canadian interests closely (Canadian International Development Agency (CIDA), Canadian Wheat Board, Export Development Corporation (EDC), Canadian Dairy Commission, and so on). At the present time, most of these agencies deliver their cargo to foreign purchasers in a Canadian port. It could become important for each of these organizations to have specialists fully acquainted with the market in order to examine the feasibility of shipping cargo, either by Canadian or by foreign ships, directly to a port of the purchasing or beneficiary country. This expertise would allow Canadians to discuss actual prices for the buyer and not just the price on delivery at Montréal or Vancouver.

Similarly, for CIDA, the grouping of certain shipments with parallel projects carried through by the private sector could bring about cost reductions and through this, enhance the competitive position for our business. Concurrently, perhaps the EDC has a role to play in arranging for certain exports financed through its services to be contracted to Canadian forwarding agents so that the latter may make groupings that are favourable to our trade.

A country like Canada with a large part of its production linked to international trade cannot afford to be ill-informed on the conditions and development of deep-sea shipping. Essentially,

this involves expertise and Canada already has specialists and practitioners in this field. They form what may be called a strategic reserve and we should not allow ourselves to slip below a certain point. If the organization of our transport is looked after by others, we should not be surprised if it does not always coincide with our interests.

From a more positive viewpoint, increasing our maritime expertise is profitable even in the short run. La Société des alcools du Québec, for example, which has built up a team in this field, has in a few years become a factor to be reckoned with in container transport through Montréal. This has enabled the Société to reduce its import costs substantially and to penetrate the markets of other provinces and of some American states by exporting shipments through Montréal.

Québec and its agencies therefore have a role to play, but the initiative must be taken at several levels. We could start with training programs in transport and trade set up in cooperation with university centres, private business and government agencies. Such programs, together with job opportunities in the organizations involved, would soon be making a valid contribution to the maritime economy already established, which has sometimes had the tendency, for lack of trained agents, to recruit outside Canada.

Conclusion

The nature of world-wide competition in the area of maritime transport is changing. It is just as intense as ever because, among other things, of large tonnage surpluses; but it is now increasingly taking place in relation to governments and their commercial and industrial requirements. Maritime transportation is therefore becoming an important element in the development strategy of certain countries. Also, due to existing tonnage surpluses, shippers are now more important than shipowners.

In this context, Canada, with practically no merchant fleet but controlling very large tonnages, is in a favourable position, provided it plays its cards properly and does not leave the entire organization of its transport to its trading partners and competitors. Some action is therefore required in this area, not only to further develop the maritime and commercial expertise now existing in Canada, but in particular to ensure that the agencies involved in these fields make use of it.

Such action could be undertaken rapidly but without neglecting the in-depth study of other major questions such as the costs and benefits associated with the possible creation of a merchant fleet.

APPENDIX III

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History and geography have conspired to make Québec one of the great maritime regions of the world, and thus of America. Québec has been shown to be Canada's "maritime province" *par excellence*. It would be only right and proper that she lead the way in the maritime sector, just as she has done in the field of hydroelectricity.

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